

IMPORTANT BIRD AND BIODIVERSITY AREAS IN INDIA

Priority sites for Conservation

Revised and updated 2nd Edition Vol. II



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**Second Edition: Revised and Updated
Volume II**

Asad R. Rahmani, M. Zafar-ul Islam and Raju M. Kasambe

Maps prepared by
Mohit Kalra and Noor I. Khan

Team Members

Noor I. Khan, Siddesh Surve, Abhijit Malekar and Nandkishor Dudhe

Significant Contribution to this edition

Anwaruddin Choudhury, Arvind Mishra, Ajai Saxena, Dhananjai Mohan, Himmat Singh Pawar, Intesar Suhail, Khursheed Ahmad, Neeraj Srivastava, P.O. Nameer, Manoj Nair, Mrutyumjaya Rao, Praveen, J., Sanjeeva Pandey, S. Subramanya, Satya Prakash

Editors
Gayatri Ugra and Maithreyi, M.R.

Layout and Design
V. Gopi Naidu

With major sponsorship from
Pavillion Foundation, Singapore

Recommended citation:

Rahmani, A.R., Islam, M.Z. and Kasambe, R.M. (2016) Important Bird and Biodiversity Areas in India: Priority Sites for Conservation (Revised and updated). Bombay Natural History Society, Indian Bird Conservation Network, Royal Society for the Protection of Birds and BirdLife International (U.K.). Pp. 1992 + xii

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Bombay Natural History Society,
Hornbill House, Shaheed Bhagat Singh Road, Mumbai-400001, INDIA.
Telephone: 0091-22-28429477 and 0091-22-22821811. Fax: 0091-22-22837615.
Email: info@bnhs.org; websites: www.bnhs.org and www.ibcn.in

Bombay Natural History Society in India is registered under Bombay Public Trust Act 1950: F244 (Bom) dated 06th July 1953.

ISBN: 978-93-84678-02-9

Cover Photographs: Design and collage by Gopi Naidu conceptualized by IBA Team.
First published: 2004 by IBCN: Bombay Natural History Society.

Second Revised Edition: 2016.

Printed by Akshata Arts Pvt Ltd. 22, A to Z Industrial Estate, G. Kadam Marg, Lower Parel, Mumbai 400 013. Published by the Bombay Natural History Society, Hornbill House, Shaheed Bhagat Singh Road, Mumbai 400 001.

Designed: V. Gopi Naidu.

Available from IBCN and BNHS website as given above.

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TAMIL NADU

IN-TN



DHritiman Mukherjee

Tamil Nadu can be broadly divided into three physiographic regions, namely the eastern coastal plains, the western hilly region, and the plains. Good natural forests survive in the Western Ghats

Tamil Nadu ($8^{\circ} 04'$ - $13^{\circ} 34'$ North and $76^{\circ} 14'$ - $80^{\circ} 21'$ East) is situated on the southeastern side of the Indian peninsula. It has a geographical area of 1,30,058 sq. km which constitutes about 4% of the land area of the country. The State is divided into 30 administrative districts.

Tamil Nadu can be divided into three physiographic regions namely, the eastern coastal region, the western hilly region and the plains. The northern and western parts of the state are mainly hilly areas of the Western Ghats with an average elevation of 1220 m, and going up to 2440 m, which is the highest point. The major rivers flowing through the State are Palar, Cheyyar, Ponnaiyar, Cauvery, Moyar, Bhavani, Amaravati, Vaigai, Chittar, and Tamaraparni. Cauvery is the eighth largest river of the Indian subcontinent and is 760 km long. There are about 37 small rivers and rivulets in the State (Sadasivan *et al.* 2000).

Tamil Nadu is basically an agricultural state with good fertile land. It is a major producer of rice, sugarcane, cotton, tea and coffee. The total human population was 72.14 million in 2011. This is 5.95 % of the country's population. About 51.6 % is rural. The human population density is 555 persons per sq. km (Census 2011).

Tamil Nadu has many important protected areas such as Anamalai, Kalakadu-Mundanthurai, Mudumalai, Point

Calimere and Vedanthangal. All of them are identified as IBAs.

The temperature ranges from as low as 0 °C in the higher reaches of the Western Ghats to as high as 42 °C in the hot plains. There are three seasons: pre-monsoon (July-September), the monsoon (October-December) and post-monsoon (January-June).

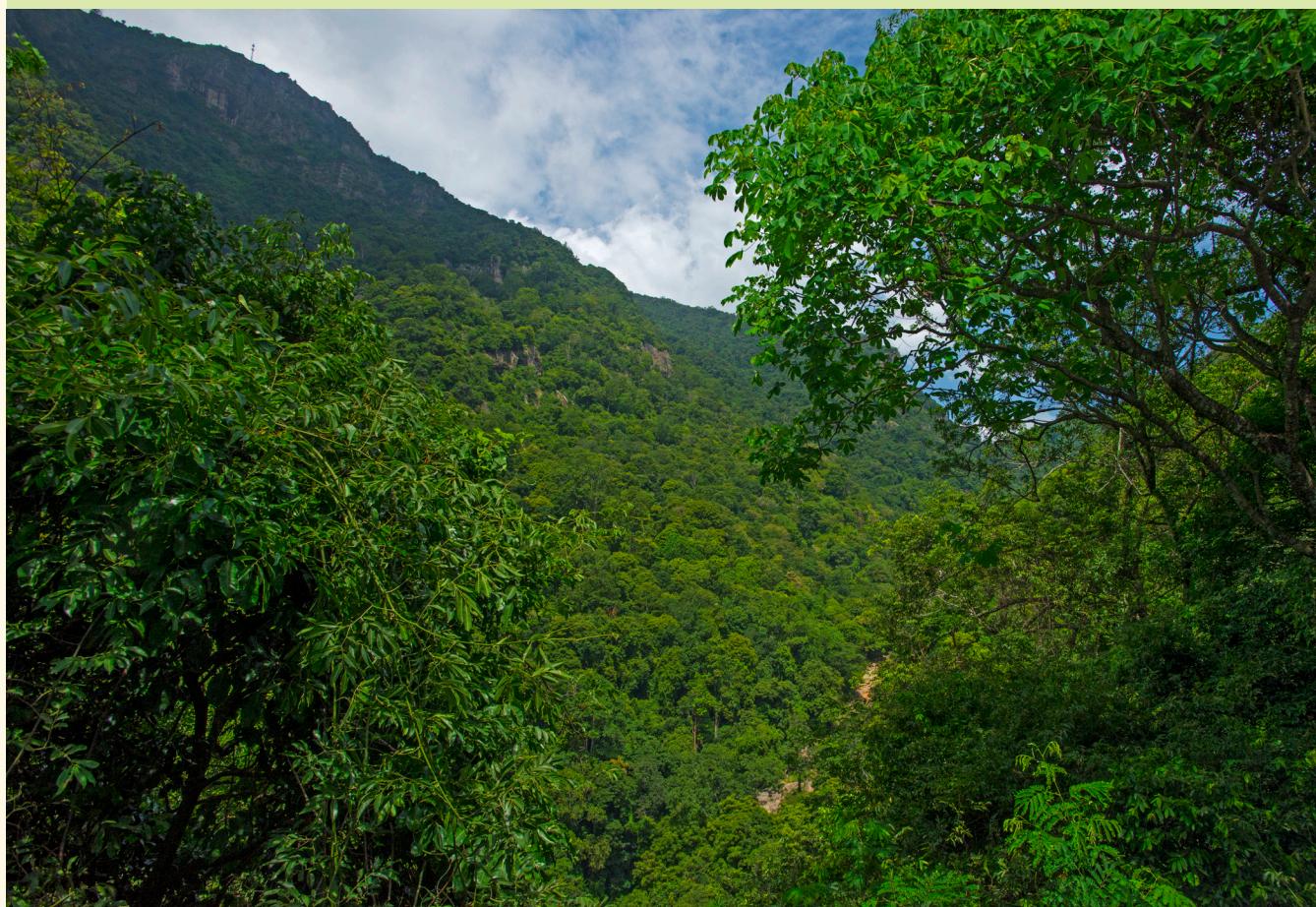
Most parts of Tamil Nadu fall in the Indo-Malayan Tropical Dry Zone (Biome-11) and some parts in the Indian Peninsula Tropical Moist Forest (Biome-10). The Western Ghats and the Southern Eastern Ghats form the major forested areas of the State. In the Western Ghats, the Nilgiri Biosphere Reserve (NBR) was the first to be set up in India under the Indian National Man and Biosphere Programme in 1986. The NBR includes forested areas of Kerala, Karnataka and Tamil Nadu and forms a total area of 5520 sq. km.

The forested area of Tamil Nadu increased from 23,625 sq. km (Ministry of Environment and Forests 2011) to 23,844 sq km. (Ministry of Environment and Forests 2013). Of this 12.36% consists of very dense forest, 42.77% is moderate dense forest and 44.87 is open forest. The Nilgiris district has highest forest cover followed by Vellore and Tiruvannamalai. The main reason for this increase in forest cover is better protection and conservation of forest.



DHRITIMAN MUKHERJEE

Mudumalai Wildlife Sanctuary (above) and Kotagiri Reserve Forests (below) form a part of the Nilgiri Biosphere Reserve



DHRITIMAN MUKHERJEE

IBAs of TAMIL NADU		
IBA site codes	IBA site names	IBA criteria
IN-TN-01	Avalanche (Nilgiris)	A1, A2, A3
IN-TN-02	Berijam (Kodaikanal)	A1, A2
IN-TN-03	Big Tank (Peria Kanmai) and Sakkarakotai Kanmai	A1, A4iii
IN-TN-04	Bison Swamp (Nilgiris)	A1, A2
IN-TN-05	Cairn Hill Reserve Forest (Nilgiri)	A1, A2
IN-TN-06	Chitrangudi and Kanjirankulam Bird Sanctuaries	A1, A4i
IN-TN-07	Governor's Shola	A1, A2
IN-TN-08	Grass Hills (To merge with IN-TN-10)	A1, A2
IN-TN-09	Gulf of Mannar Marine National Park	A1, A4iii
IN-TN-10	Indira Gandhi WLS and National Park	A1, A2, A3
IN-TN-11	Kalakad-Mundanthurai Tiger Reserve	A1, A2
IN-TN-12	Kaliveli Tank and Yedayanthittu Estuary	A1, A4i, A4iii
IN-TN-13	Karaivetti Bird Sanctuary	A1, A4i, A4iii
IN-TN-14	Kunthangulam Bird Sanctuary	A1, A4i
IN-TN-15	Kothagiri Longwood Shola	A1, A2
IN-TN-16	Kullur Sandai Reservoir	A1
IN-TN-17	Mudumalai National Park	A1, A2, A3
IN-TN-18	Mukurthi National Park	A2, A2
IN-TN-19	Naduvattam Forest Range (Nilgiris)	A1, A2
IN-TN-20	Point Calimere Wildlife and Sanctuary	A1, A4i, A4iii
IN-TN-21	Poomparai and Kukkal	A1, A2
IN-TN-22	Kodaikanal Wildlife Sanctuary and Surrounding Sholas	A1, A2
IN-TN-23	Srivilliputhur Wildlife Sanctuary	A1, A2
IN-TN-24	Suchindram, Therur and Vembanoor Wetlands	A1, A4i
IN-TN-25	Thaishola	A1, A2, A3
IN-TN-26	Tirunelveli Reserve Forest including Kanyakumari WLS	A1, A2, A3
IN-TN-27	Madurai Tanks (Vandiyur, Kunnathur, Avaniapuram)	A1
IN-TN-28	Vaduvoor Lake Bird Sanctuary	A1
IN-TN-29	Vedanthangal and Karikili Bird Sanctuary	A1, A4iii
IN-TN-30	Veeranam Lake	A1, A4i, A4iii
IN-TN-31	Vettangudi Bird Sanctuary	A1, A4i
IN-TN-32	Watrap Periakulam and Virakasamuthrakulam	A1, A4i, A4iii
IN-TN-33	Wellington Reservoir	A1, A4iii
IN-TN-34	Muthukuzhi	A1, A2
IN-TN-35	Megamalai Mountains	A1, A2
IN-TN-36	Melagiris	A1, A2, A3
IN-TN-37	Odiyur Lagoon	A1, A4i, A4iii
IN-TN-38	Pichavaram Mangroves	A1, A4i, A4iii
IN-TN-39	Tiruppadaimarudur Conservation Reserve	A4i

Of the 427 Indian plants listed under various descriptions, e.g. extinct, possibly extinct, endangered, or vulnerable, as many as 123 species occur or are known to have occurred in Tamil Nadu. It is also relevant that of the 123 species relating to Tamil Nadu as many as 62 species are described as endemic to the limits of Tamil Nadu (Red Data Book of Indian Plants 1987).

The Eastern and Western Ghats meet along the Moyar Gorge with Biligirirangan Hills along the northeast and the Nilgiris on the southwest. This results in a series of forest

gaps in the Ghats, which are actually valleys that break the continuity of the mountain ranges, such as the Palghat Gap, the Moyar Gap or Gorge and the Chenkotta (= Shenkotta) Gap. These gaps have prevented the spread of certain species and hence facilitated local speciation and endemism.

Tamil Nadu has a total of 36 protected areas, of which five are national parks and 12 are wildlife sanctuaries, four tiger reserves, 12 bird sanctuaries and three biosphere reserves (Tamil Nadu Forest Department 2014).

The Ramsar Convention has designated 25 wetlands of

LIST OF THREATENED BIRDS WITH IBA SITE CODES		
CRITICALLY ENDANGERED		
White-backed Vulture (very rare now)	<i>Gyps bengalensis</i>	IN-TN-17, 23
Long-billed Vulture (very rare now)	<i>Gyps indicus</i>	IN-TN-17, 23
Red-headed Vulture (very rare now)	<i>Aegypius calvus</i>	IN-TN-11
Spoon-billed Sandpiper (old records)	<i>Eurynorhynchus pygmeus</i>	IN-TN-20
ENDANGERED		
Egyptian Vulture	<i>Neophron percnopterus</i>	
Spotted Greenshank	<i>Tringa guttifer</i>	IN-TN-20
Black-bellied Tern	<i>Sterna acuticauda</i>	IN-TN-29
Nilgiri (Black-chinned) Laughingthrush	<i>Strophocincla cachinnans</i>	IN-TN-01, 04, 05, 07, 15, 18, 19, 25, 34
White-bellied Blue Robin	<i>Myiomela albiventris</i>	IN-TN-02, 08, 10, 11, 21, 22, 23, 26, 34
Nilgiri Blue Robin	<i>Myiomela major</i>	IN-TN-01, 04, 05, 07, 15, 18, 19, 25
VULNERABLE		
Lesser Adjutant	<i>Leptoptilos javanicus</i>	IN-TN-17
Greater Spotted Eagle	<i>Clanga clanga</i>	IN-TN-08, 12, 29
Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>	IN-TN-01, 02, 04, 05, 07, 08, 10, 11, 15, 17, 18, 19, 21, 22, 23, 25, 26, 34
Yellow-throated Bulbul	<i>Pycnonotus xantholaemus</i>	IN-TN-17
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>	IN-TN-08, 10, 17, 20, 23, 26, 34
Kashmir Flycatcher	<i>Ficedula subrubra</i>	IN-TN-19, 21
White-naped Tit	<i>Parus nuchalis</i>	IN-TN-17
Nilgiri Pipit	<i>Anthus nilghiriensis</i>	IN-TN-01, 02, 04, 08, 10, 11, 18, 19, 21, 22, 23, 25, 34
NEAR THREATENED		
Jouanin's Petrel	<i>Bulweria fallax</i>	Not found in any IBA
Spot-billed Pelican	<i>Pelecanus philippensis</i>	IN-TN-03, 06, 09, 12, 13, 14, 16, 20, 24, 27, 28, 29, 30, 31, 32, 33
Oriental Darter	<i>Anhinga melanogaster</i>	IN-TN-03, 10, 11, 13, 14, 20, 24, 27, 28, 29, 30, 31, 32, 33
Painted Stork	<i>Mycteria leucocephala</i>	IN-TN-03, 06, 11, 12, 13, 14, 20, 24, 27, 28, 29, 30, 31, 32, 33
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	IN-TN-03, 12, 20
Black-headed Ibis	<i>Threskiornis melanocephalus</i>	IN-TN-03, 06, 13, 14, 20, 24, 27, 28, 29, 30, 31, 32, 33
Lesser Flamingo	<i>Phoeniconaias minor</i>	IN-TN-12, 20
Grey-headed Fish-eagle	<i>Ichthyophaga ichthyaetus</i>	IN-TN-11
Pallid Harrier	<i>Circus macrourus</i>	IN-TN-10, 12, 20
Red-headed Falcon	<i>Falco chicquera</i>	
Great Thick-knee	<i>Esacus recurvirostris</i>	
River Lapwing	<i>Vanellus duvaucelii</i>	
Eurasian Curlew	<i>Numenius arquata</i>	
Black-tailed Godwit	<i>Limosa limosa</i>	
River Tern	<i>Sterna aurantia</i>	
Malabar Pied Hornbill	<i>Anthracoceros coronatus</i>	
Great Pied Hornbill	<i>Buceros bicornis</i>	IN-TN-10, 11
Grey-headed Bulbul	<i>Microtarsus priocephalus</i>	
Palni (Kerala) Laughingthrush	<i>Strophocincla fairbanki</i>	IN-TN-02, 08, 21, 22
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>	IN-TN-01, 02, 04, 05, 08, 10, 11, 15, 17, 18, 19, 21, 22, 23, 25, 34
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>	IN-TN-01, 02, 04, 05, 10, 11, 15, 18, 19, 21, 22, 23, 25, 34
Tytler's Leaf-warbler	<i>Phylloscopus tytleri</i>	

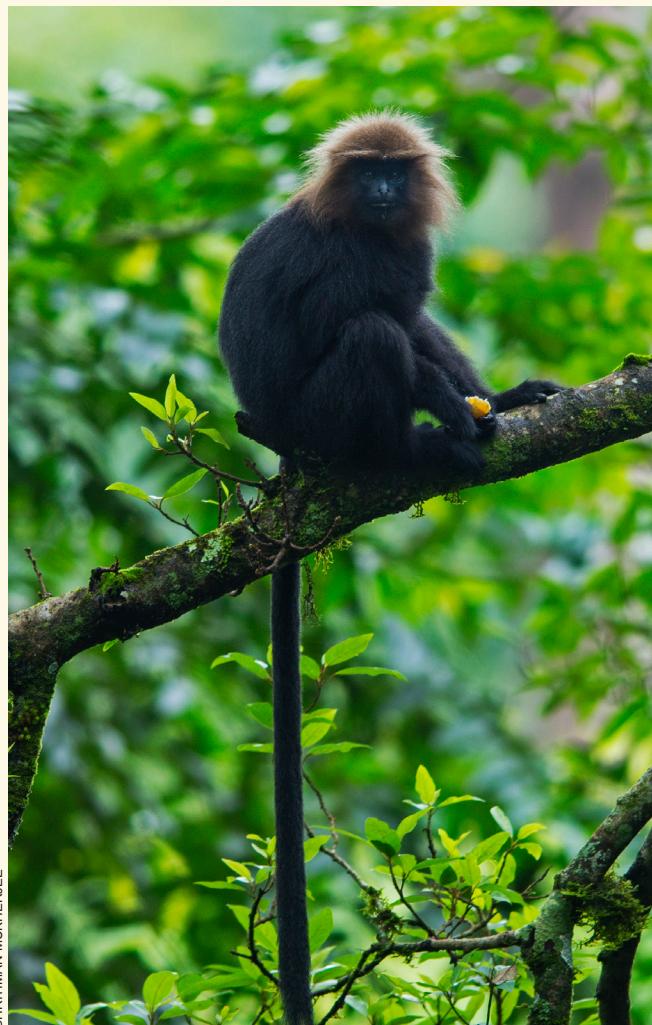
International Importance in India. Point Calimere Wildlife and Bird Sanctuary is one among them, designated in November 2002 (Ministry of Environment and Forest 2002). This is an important and famous IBA site. Islam and Rahmani (2008) have identified 11 potential Ramsar Sites that qualify the Ramsar criteria. All these 11 wetland sites are also IBAs.

Important mammal species are Tiger *Panthera tigris*, Leopard *Panthera pardus*, Sloth Bear *Melursus ursinus*, Asiatic Elephant *Elephas maximus*, Nilgiri Thar *Nilgiritragus hylocrius*, Gaur *Bos gaurus*, Four-horned Antelope *Tetracerus quadricornis*, Wild Dog *Cuon alpinus*, Nilgiri Langur *Trachypithecus johnii*, Brown-palm Civet *Paradoxurus jerdoni*, Honey Badger *Mellivora capensis*, Smooth-coated Otter *Lutrogale perspicillata*, and Malabar Spiny Dormouse *Platacanthomys lasiurus*. Grey Wolf *Canis lupus pallipes* is occasionally seen in drier part of Tamil Nadu. In the coastal waters of Tamil Nadu (and India), Indian Humpback Dolphin *Sousa chinensis*, Long-beaked Common Dolphin *Delphinus capensis*, and Blue Whale *Balaenoptera musculus* are reported.

Some new species and rediscoveries from Tamil Nadu

Biju *et al.* (2014) describes 14 new species of dancing frogs from Western Ghats. Alam *et al.* (2012) rediscovered a threatened liverwort, *Exormotheca ceylonensis* from Palini Hills. Dinakaran (2013) identified a new species of caddisfly, *Lepidostoma nuburagangai* from Alagar Hills. This new species was named after the stream, Nuburagangai, located at Alagar Hills. Ramachandran *et al.* (2011) rediscovered an endemic plant, *Caralluma diffusa*, after 160 years from Coimbatore. Manickavasagam & Rameshkumar (2013) described two new species of parasitic wasps, *Adekititopus hayat* and *Rhopus tamilanus* from the state. A rare limbless burrowing caecilian was described from Kaakkaachi-Naalumukku area of the Kalakad Mundanthurai Tiger Reserve in the Western Ghats area of Tamil Nadu. The species was named *Uraeotyphlus gansi* (Gower *et al.* 2008).

A team of scientists rediscovered five species of frogs believed to be extinct long ago. Two of these include Chalazodes Bubble-nest Frog *Raorchestes chalazodes*, which was last reported in 1874 from the Kalakkad-Mundanthurai



DHIRITMAN MUKHERJEE



DHIRITMAN MUKHERJEE

Nilgiri Langur (left) and Lion-tailed Macaque (right) are two famous endemic primates of the Western Ghats.

Both are found in many protected areas and IBAs

LIST OF THREATENED BIRDS WITH IBA SITE CODES		
ENDEMIC BIRD AREA 123: WESTERN GHATS		
Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>	IN-TN-01, 02, 04, 05, 07, 08, 10, 11, 15, 17, 18, 19, 21, 22, 23, 25, 26, 34, 35, 36
Nilgiri Imperial-pigeon	<i>Dacula badia cupria</i>	
Malabar or Blue-winged Parakeet	<i>Psittacula columbooides</i>	IN-TN-10, 11, 23, 26, 35, 36, 40
Malabar Grey Hornbill	<i>Ocyceros griseus</i>	IN-TN-10, 11, 15, 23, 26, 35
Nilgiri Pipit	<i>Anthus nilghiriensis</i>	IN-TN-01, 02, 04, 08, 10, 11, 18, 19, 21, 22, 23, 25, 26, 34, 35
Grey-headed Bulbul	<i>Microtarsus priocephalus</i>	IN-TN-01, 10, 11, 15, 19, 23, 26, 34, 35
Yellow-browed Bulbul	<i>Iole indica</i>	IN-TN-40
White-bellied Blue Robin	<i>Myiomela albiventris</i>	IN-TN-02, 08, 10, 11, 21, 22, 23, 26, 34, 35
Nilgiri Blue Robin	<i>Myiomela major</i>	IN-TN-01, 04, 05, 07, 15, 18, 19, 25
Wynaad Laughingthrush	<i>Dryonastes (Garrulax) delesserti</i>	IN-TN-08, 10, 11, 23, 26, 34
Nilgiri (Black-chinned) Laughingthrush	<i>Strophocincla cachinnans</i>	IN-TN-01, 04, 05, 07, 15, 18, 19, 23, 25, 34
Palni (Kerala) Laughingthrush	<i>Strophocincla fairbanki</i>	IN-TN-02, 08, 10, 11, 21, 22, 26, 34, 35
Indian Rufous Babbler	<i>Turdoides subrufus</i>	IN-TN-10, 11, 17, 21, 23, 26, 34, 35, 40
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>	IN-TN-08, 10, 11, 17, 23, 26, 34, 35
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>	IN-TN-01, 02, 04, 05, 07, 08, 10, 11, 15, 17, 18, 19, 21, 22, 23, 25, 26, 34, 35
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>	IN-TN-01, 02, 04, 08, 10, 11, 15, 18, 19, 21, 22, 23, 25, 34, 35
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>	IN-TN-10, 11, 15, 17, 23, 26, 34, 35
Small Sunbird	<i>Leptocoma minima</i>	IN-TN-01, 02, 04, 05, 07, 08, 10, 11, 15, 17, 18, 19, 21, 22, 23, 25, 26, 34, 35, 36
Grey-fronted Green-pigeon (Pompadour Green-pigeon)	<i>Treron pompadora</i>	
Malabar Barbet (Crimson-fronted)	<i>Megalaima malabarica</i>	IN-TN-35
Flame-throated Bulbul	<i>Pycnonotus gularis</i>	
Nilgiri Thrush	<i>Zoothera neilgherriensis</i>	IN-TN-35
Nilgiri Flowerpecker	<i>Dicaeum concolor</i>	IN-TN-35, 36
Malabar Woodshrike	<i>Tephrodornis sylvicola</i>	IN-TN-35
Malabar Starling	<i>Sturnia blythii</i>	IN-TN-35
White-bellied Treepie	<i>Dendrocitta leucogastra</i>	IN-TN-10, 11, 17, 23, 26, 34

IN-TN

region, and Anamalai Dot-frog *Ramanella anamalaiensis*, which was last seen in 1937 (<http://www.thehindu.com/sci-tech/energy-and-environment/five-frog-species-rediscovered/article1462797.ece> as accessed 15 June 2014).

Vegetation

The principal forest types in Tamil Nadu are the Tropical Rain Forests, Dry Deciduous Forests, Dry Thorn Forests, Montane *Shola*, Grassland and Mangroves. According to the 2001 report of the Forest Survey of India, the forest area is 2.26 million ha which constitutes 17.40% of the land area of the State. The flora and fauna of the Western Ghats in particular are of great interest from the scientific point of view because they illustrate the phenomenon of discontinuous parallel distribution. Out of about 35,000 species of flowering plants in the whole of India, about 3,000 species are found in Tamil Nadu.

The flora of the Nilgiris show a relationship with that of the Eastern Himalaya and the forest in this region is evergreen composed of tropical and subtropical vegetation (Lakshminarayana *et al.* 2002). Of 2100 species of flowering plants endemic to peninsular India, 818 are found in the Nilgiris and adjoining areas (Mohanam and Balakrishnan 1991).

Tamil Nadu has a long coastline of about 999 km (Ramakrishna and Venkataraman 2001). Of this, 574 km form sandy coast, 31 km form rocky coast, and 394 km form muddy coast. This occurs mostly on the east coast and constitutes 18.9% of the coastline of India. Apart from the extensive fishery - inshore and offshore regions of Tamil Nadu - the coastal habitat is of great importance for its many special features, particularly the estuaries and wetlands with their complex and dynamic ecosystems. The following major estuaries are found in the State: Edayar, Ennore,



Nilgiri Tahr is endemic to southern Western Ghats. Mukurthi National Park is famous for good population of this endemic animal

Cooum, Adayar, Uppanar, Vellar, Kollidam, Cauvery (= Kavery), Agniyar and Kallar. Tamil Nadu has only a very small representation of mangroves, a mere 2640 ha (0.46% of the total mangrove area in India). The main mangrove formations in the State are at Pichavaram at the northern extremity of the Cauvery delta in the Cuddalore district and in the areas of Chatram, Adhirampattinam, Point Calimere and Muthupet of Nagapatinam district and in the Thanjavore (Tanjore) district. These are considered ecologically sensitive areas of the east coast of Tamil Nadu.

The Gulf of Mannar Marine Biosphere Reserve (famous IBA site) of Tamil Nadu, is the first marine biosphere of this kind to be established in India on the east coast, during 1989 (Ministry of Environment and Forests 1989). The seabed has a rich vegetation of seaweed and sea grasses, and also has small patches of mangrove vegetation. Within the Gulf of Mannar Marine Biosphere Reserve is the Gulf of Mannar Marine National Park. The Gulf of Mannar Marine National Park harbours Endangered marine mammal, *Dugong dugon*. Its proximity to Sri Lanka makes this IBA an important flyway for migratory birds. It is famous for congregation of waders: sometimes more than 50,000 waterbirds are found here. About 187 species of aquatic and terrestrial birds have been identified from this IBA site (Balachandran 1990, 1995). Pelagic birds are also recorded (Balachandran 1990).

AVIFAUNA

An annotated checklist of the birds of Tamil Nadu is being prepared by bird watchers and contains more than 515 species which are confirmed and another 70 species are likely to occur (Santharam, *pers. comm.*, 2015). Among the Critically Endangered species, White-rumped Vulture *Gyps bengalensis*, Long-billed Vulture *Gyps indicus*, Red-headed Vulture *Aegypius calvus*, and Spoon-billed Sandpiper *Eurynorhynchus pygmeus* has been reported to occur in the State. There is no confirmed sighting of the Spoon-billed Sandpiper in Tamil Nadu for the last 20 years or more. BirdLife International (2014) has listed 18 Endangered species in India, of which, the Black-chinned Laughingthrush *Strophocincla cachinnans* has definitely been recorded, and the Spotted Greenshank *Tringa guttifer* has been recorded in one IBA. The Lesser Adjutant *Leptoptilos javanicus*, and Wood Snipe *Gallinago nemoricola* are occasionally seen. Fifteen out of 54 Vulnerable species listed for India by BirdLife International (2014) are found in Tamil Nadu.

The Western Ghats region occurring in Tamil Nadu contains high diversity and a great number of endemic rainforest plants and animal taxa (Nair and Daniel 1986, Vasudevan *et al.* 2001). Some of the key species of this region are the Nilgiri Wood-pigeon *Columba*



DHRTIMAN MUKHERJEE

Thanks to good protection, population of Gaur *Bos gaurus* has increased considerably and small herds or solitary animals are frequently seen in tea estates and even at the outskirts of towns

elphinstoni, Blue-winged Parakeet *Psittacula columbooides*, Malabar Grey-Hornbill *Ocyceros griseus*, Nilgiri Pipit *Anthus nilghiriensis*, Grey-headed Bulbul *Microtarsus priocephalus*, Black-and-Orange Flycatcher *Ficedula nigrorufa*, Indian Broad-tailed Grass-warbler *Schoenicola platyurus*, Small Sunbird *Leptocoma minima*, Kerala Laughingthrush *Strophocincla fairbanki*, Black-chinned Laughingthrush *Strophocincla cachinnans*, Nilgiri Flycatcher *Eumyias albicaudatus*, Indian Rufous Babbler *Turdoides subrufus*, White-bellied Blue Flycatcher *Cyornis pallipes*, White-bellied Blue Robin *Myiomela albiventris*, White-bellied Treepie *Dendrocitta leucogastra*, and Wynad Laughingthrush *Garrulax delesserti*. Besides the endemic species, the Near Threatened Spot-billed Pelican *Pelecanus philippensis* is found in the State in significant numbers (Rahmani 2012).

BirdLife International (2014) has listed 81 Near Threatened bird species of India. Fifteen occur in Tamil Nadu. For 13 such species, the IBAs and protected areas of Tamil Nadu are highly important for survival. Earlier, Nagulu and Rao (1983) and recently Manakadan and Kannan (2003) have shown that the wetlands of Tamil Nadu are the major strongholds of the Spot-billed Pelican. It is found in 16 of the 39 IBAs of Tamil Nadu.

IBAS OF TAMIL NADU

In 2004, national inventory of Important Bird Areas was published in India. BirdLife International had identified 34 IBAs (Islam and Rahmani 2004). Since then, five more sites have been added to this list. Actually, many more sites were suggested by ornithologists of the state, but due to lack of good information, only five were finally added in this book.

One of the aims of our book is to encourage people to conduct more extensive and better surveys, and to document their information in the form of research papers and reports. Perhaps in a few years time, more sites would be identified that qualify the IBA criteria of BirdLife International.

We found that few sites could be combined. For example, Grass Hills (IN-TN-08) is a part of Indira Gandhi Wildlife Sanctuary (IN-TN-10), also called Anamalai Wildlife Sanctuary. Similarly, many small *shola* patches of the Nilgiris (e.g. Bison Swamp IN-TN-04, Cairn Hill Reserve Forest IN-TN-05, Governor's Shola IN-TN-07) could have been combined as one IBA, despite the fact that they are separated from each other through human-dominated landscape. Like the earlier book (2004), in this book also, we are treating them separately. A total of 39 sites have been described.

Biomes

Tamil Nadu has two biomes, Biome-11: Indo-Malayan Tropical Dry Zone and Biome-10: Indian Peninsula Tropical Moist Forest. Biome-11 contains 59 species, four of which are globally threatened (BirdLife International, undated). They are the White-rumped Vulture *Gyps bengalensis*, Long-billed Vulture *Gyps indicus*, Red-headed Vulture *Aegypius calvus*, and Red-headed Falcon *Falco chicquera*.

Biome-10 contains 15 species of which the Indian Broad-tailed Grass-warbler *Schoenicola platyurus*, Kashmir Flycatcher *Ficedula subrubra*, White-naped Tit *Parus nuchalis*, Nilgiri Wood-pigeon *Columba elphinstonii*, Yellow-throated Bulbul *Pycnonotus xantholaemus*, are Vulnerable. All these species are found in Tamil Nadu and for some species, this State is extremely important for their long-term survival.

Endemic or Restricted Range species

Stattersfield *et al.* (1988) had identified 16 restricted range species in the Western Ghats. Almost all these species are found in Tamil Nadu. Recently, Rasmussen and Anderton (2005, 2012) and del Hoyo and Collar (2014) have upgraded many subspecies in to full species, so the totally of endemic species of the Western Ghats has gone to 26. Except for Vigor's Sunbird *Aethopyga vigorsii* that is found only in northern Western Ghats, all other upgraded species are found in Tamil Nadu.

THREATENED BIRDS FOR WHICH TAMIL NADU IS IMPORTANT

Spot-billed Pelican *Pelecanus philippensis* Near Threatened

Tamil Nadu is one of the states which harbours this species in considerable numbers (Manakadan and Kannan

2003, Kannan 2004, Rahmani 2012). The species was under threat due to disturbance, persecution, degradation of wetlands by pollution, entanglement in fishing equipment, and decline in food supplies (Crivelli and Schreiber 1984) but now many threats have been removed. Therefore, now it is regularly seen all along the bigger inland wetlands of Tamil Nadu such as Vedanthangal and the Karikili Bird Sanctuary, the Gulf of Mannar, Suchindarm, the Therur Wetland Complex, Point Calimere, Koonthangulam, Karivetti, Kaliveli and Edyanthittu. In 2004, most of the wetland IBAs were selected due to the presence of Spot-billed Pelican which was considered as Vulnerable at that time. Now it has been downlisted to Near Threatened, but we are retaining the IBAs.

Lesser Adjutant *Leptoptilos javanicus* Vulnerable

The Lesser Adjutant is mainly resident in central and northeastern India (Ali and Ripely 1987). In Tamil Nadu the species has been recorded at Mudumalai Wildlife Sanctuary, Anaimalai hills, Kuriarkutti and in 1988 at Karian Shola. The species has experienced decline due to variety of threats including hunting pressure, loss of nesting trees, conversion and degradation of wetlands and agricultural changes and intensification. (BirdLife International 2014).

Wood Snipe *Gallinago nemoricola* Vulnerable

The species was not uncommon during the nineteenth and early twentieth centuries. It is relatively widespread but generally scarce (BirdLife International 2014). The determination of the status of this species is difficult, as the bird generally skulks and is relatively difficult to identify. The cause behind the decline of the species is reported to be habitat loss and localized hunting in wintering grounds. In



Jerdon's Bush-lark and Malabar Lark are two endemic species of the Western Ghats, with good populations in many IBAs





DHIRITMAN MUKHERJEE

There is a small colony of Long-billed Vulture *Gyps indicus* in Sathyamangalam area. White-rumped Vulture *Gyps bengalensis* and Red-headed Vulture *Aegyptius caurus* are often seen

Tamil Nadu there are records of the species from Shevaroy Hills (Hume and Marshall 1879–1881), Nilgiris (Phythian-Adams 1948, Stoney 1938), Kotagiri (Khan 1980), Anamalai Hills (Williams 1937), and the Palni Hills. Zarri *et al.* (2008a) during their studies between December 2000 and April 2004 in the Upper Nilgiris, did not record any individual of this species. They also could not find any suitable undisturbed wetland habitat where this bird could winter. There is a recent record from Kanyakumari district, near Mahendragiri peak, Ashambu Hills in 2004 (Christopher 2004). C. Sashikumar, famous ornithologist of Kerala, was also present during the sighting.

Spoon-billed Sandpiper *Eurynorhynchus pygmeus* Critically Endangered

The Spoon-billed Sandpiper inhabits a very specific breeding habitat, mainly seacoasts (Tomkovich 1991). The distribution of this species is typical, and follows the “keyboard” pattern of the west Pacific shoreline geology and hence the species’ range is naturally fragmented (BirdLife International 2001). In wintering grounds it occurs on sandy beaches, estuaries and mudflats. In Tamil Nadu it was earlier reported from Point Calimere (Sugathan 1983, 1985) but there is no recent record. Its small population is

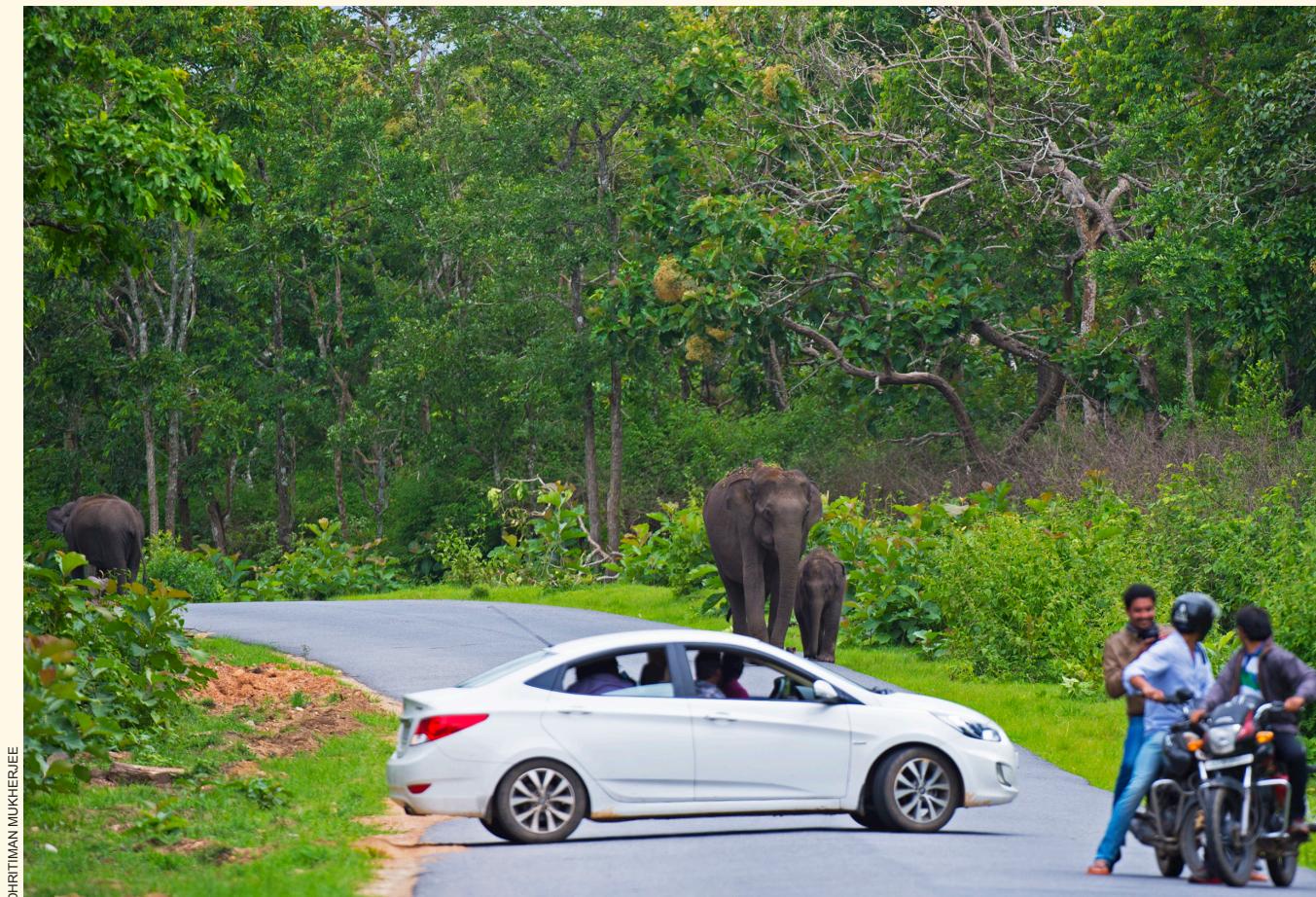
declining due to habitat loss in its breeding and wintering grounds, with associated disturbance and hunting: therefore the species is designated as Critically Endangered.

Nilgiri Wood-pigeon *Columba elphinstonii* Vulnerable

According to Ali and Ripley (1987) the birds move from higher hills to lower regions in cold weather. Vast areas of the Anamalai Hills have been denuded or selectively logged since the forest area began to be cleared for tea plantation and timber cultivation in the 1800s (Kannan 1998). Due to these reasons the species has a declining population. In Tamil Nadu it has been reported from Avalanche, Grass Hills (Anamalais), Mudumalai Wildlife Sanctuary, Siruvani Foothills, Kalakadu Wildlife Sanctuary, Coonoor, Cairnhill Reserve Forest, Bison Swamp, Longwood Shola (Kothagiri), Muthukuzhi and many good reserve forests.

Yellow-throated Bulbul *Pycnonotus xantholaemus* Vulnerable

This bulbul inhabits sparse thorn scrub, interspersed with some large trees among broken stony hillocks (Ali and Whistler 1942–1943). It is endemic to southern peninsular India, where it is patchily distributed (Abdulali 1949, Ali



DHIRITMAN MUKHERJEE

Encounter with wild Asiatic Elephants is not infrequent on Mudumalai-Mysore road

and Ripely 1987, Subramanya *et al.* 1995). This species is Vulnerable because of its fragmented population and because of the degradation of its scrub and forest habitats. In Tamil Nadu the species has been recorded from the Shevaroy Hills (Karthikeyan 1995), Mudumalai, Anamalai (Kannan 1992, 1998) and the Lower Palni Hills (Nichols 1943–1945).

White-bellied Blue Robin *Myiomela albiventris*
Endangered

Erroneously placed with shortwings in *Brachypteryx*, Rasmussen & Anderton (2005, 2012) placed both birds (*Brachypteryx major* and *Brachypteryx major albiventris*) to the genus which it bears most resemblance, *Myiomela*. The one found to the south of the Palghat Gap is White-bellied Blue Robin *Myiomela albiventris* while the one found to the north of Palghat Gap is Nilgiri Blue Robin *Myiomela major*. Even after revision of genus, both the species still remain globally threatened. The White-bellied Blue Robin is endemic to the southern portion of the Western Ghats, mostly inhabiting in western Tamil Nadu. In particular, the species occurs in Palni (fairly common) and Anaimalai Hills, Kodaikanal and Ashambu (Agasthyamalai) Hills (BirdLife International 2014). The decline of the species is claimed to be due to fragmentation of habitat, and destruction of its evergreen and semi-evergreen

forest habitat. Encroachment in Western Ghats is also one of the major threats to this bird. In addition to this, because of its montane distribution close to the maximum altitude within its range, the bird is also vulnerable to the climate change (BirdLife International 2014).

Nilgiri (Black-chinned) Laughingthrush
Strophocinclla cachinnans
Endangered

The Black-chinned Laughingthrush, earlier term Nilgiri Laughingthrush, is endemic to the Western Ghats. The species is truly endemic to the Nilgiris, where its range is ‘curiously restricted’ to montane forests (Ali and Ripley 1987). In Tamil Nadu particularly, the species has been reported from Naduvattam (BirdLife International 2001), Kotagiri (Davison 1883, Hume and Oates 1889–1890), Longwood Shola and Kil Kothagiri (Gokula and Vijayan 1996), Udagamandalam (Ooty), Cairnhill Reserve Forest (BirdLife International 2001), Mukurthi National Park (Islam 1985; Robertson and Jackson 1992; Vijayan *et al.* 1999), Avalanche and Upper Bhavani (Vijayan *et al.* 1999), and Governer’s Shola (Islam 1985). In the 19th century, the species was judged “exceedingly numerous” (Davison 1883) and in the early 20th century it continued to be

called “extremely common” (Baker 1922-1930). The species underwent rapid decline due to large-scale conversion of habitats into plantations, reservoirs, and crops. Human habitation poses the major threat to the species (Vijayan *et al.* 1999). Vijayan *et al* (2000), Zarri (2005) and Zarri *et al.* (2008b) have conducted studies on this species in the Nilgiris.

Indian Broad-tailed Grass-warbler *Schoenicola platyurus*
Vulnerable

This species is a grassland specialist. The principal population is mainly confined to the Western Ghats of South India. In Tamil Nadu the species occurs in Mudumalai (Gokula and Vijayan 1996), Grass Hills (Kannan 1998), Point Calimere (Hussian 1976); Anamalai hills (BirdLife International 2001), Palni Hills (BirdLife International 2001, Nichols 1937, Santharam 1996), Kalakadu-Mundanthurai (Shankar Raman 1998), and Agastiamalai (Zacharias and Gaston 1999). The species has a small, severely fragmented range and population due to modification and clearance of grasslands, its population is on decline. Presently, it is classified as Vulnerable (BirdLife International 2014).

Kashmir Flycatcher *Ficedula subrubra*
Vulnerable

The Kashmir Flycatcher is a migratory species in Tamil Nadu. The species has a very restricted distribution in northern India and a small number in Pakistan. Recent

information about the species is that it winters in the Nilgiri Hills of south India (Harrap and Redman 1990, Karthikeyan and Athreya 1993). Studies by Zarri & Rahmani (2004) revealed that some individuals spend the whole winter in the Western Ghats, particularly in the Nilgiri Hills.

SOME NEW RECORDS FOR TAMIL NADU

Greylag Goose *Anser anser*

A single Greylag Goose was sighted by Elamon (2013) in a flock of Bar-headed Goose in a village tank near Koonthakulam, which is far from its distribution range. The bird was seen at that place for over a month. This is the first record from Tamil Nadu.

Isabelline Wheatear *Oenanthe isabellina*

Muthunarayanan *et al.* (2013) sighted three different individuals from three different places in Tamil Nadu during the year 2011-2013. Hence it can be said that the bird occurs more regularly and widely in Tamil Nadu. This was the first record of this species from the state.

Chinese Pond-heron *Ardeola bacchus*

Kanide (2013) sighted an unusual Pond-heron with a dark, chestnut-coloured head, neck and breast at Kelabakkam backwaters in Tamil Nadu. Later the bird was identified as Chinese Pond Heron; this was the first record for Tamil Nadu.



SAJNAK PAL

Raorchestes nerostagona (Biju and Bossuyt 2005) is a canopy species of frog endemic to southern Western Ghats of India.

It is distributed from Agumbe till Wayanad plateau. This species inhabits canopies of huge trees ranging from 10 to 20 meters in height and can be easily noticed during monsoon season because of its unique mating call. The call resembles sound of droplet falling in water. Important Bird and Biodiversity Areas protect all biodiversity

PELAGIC BIRDS OF TAMIL NADU

The offshore of Tamil Nadu is an excellent place for sighting some pelagic birds. Flesh-footed Shearwater *Ardeenna carneipes*, Swinhoe's Storm-petrel *Oceanodroma monorhis*, Wilson's Storm-petrel *Oceanites oceanicus*, Bridled Tern *Onychoprion anaethetus*, Sooty Tern *Onychoprion fuscatus*, Lesser Noddy *Anous tenuirostris* and, Brown Noddy *Anous stolidus* are some the common pelagic birds (Manivannan 2013). Rarities includes White-tailed Tropicbird *Phaethon lepturus*, Streaked Shearwater *Calonectris leucomelas*, Tropical Shearwater *Puffinus bailloni*, Jouanin's Petrel *Bulweria fallax* (Near Threatened), and South Polar Skua *Stercorarius maccormicki* (Praveen *et al.* 2013)

THREATS AND CONSERVATION ISSUES

Tamil Nadu state also suffers from the plethora of conservation issues that beset other neighbouring states such as encroachment on forest lands, cutting of timber and other forest produce, habitat alteration by growing plantation crops, construction of dams, poaching, shifting cultivation and grazing. In Tamil Nadu 39 IBAs have been identified, some more are likely to be found in future. Twenty out of 39 IBAs suffers from agriculture intensification and expansion, while in 17 we found habitat destruction due to industrialization and urbanization. In at least three IBAs, dams are planned. Firewood collection and unsustainable exploitation is the cause of threats to 23 IBAs. Disturbance to birds in the form of hunting, and trapping was seen in 15 IBAs but it is much more widespread, especially in non-protected areas.

The majority of the people in Tamil Nadu are agriculturalists and therefore, need water for irrigation. Almost everywhere, the wetlands in Tamil Nadu have come under extreme pressure from human activities. Vast areas have been drained for agriculture and urban development or have been converted into paddy fields, aquaculture ponds, water storage reservoirs or saltponds. In recent years, the coastal ecosystem has been greatly disturbed by siltation, erosion, flooding, damage to aquifers, pollution and conversion to various industrial and agricultural uses and for construction. Wetlands of all types have been polluted with domestic sewage, herbicides, pesticides, fertilizers, industrial effluents and other waste products. Fish stocks are being over-exploited or decimated by excessive fishing. The wetlands in Tamil Nadu are silting up. The most serious threats have been drainage or reclamation for agriculture, aquaculture, industry and urban development. The total inland wetland area of Tamil Nadu comprises 49,877 ha (Alfred and Nandi 2001). The rate of degradation and the loss of wetlands is increasing. A management plan to conserve the wetlands is required to minimize anthropogenic pressures.

In recent days, the anthropogenic activities around the coastal and estuarine environment have increased the degradation of this fragile ecosystem, which is vital for several shore birds and their associated fauna. Some of the issues pertaining to this ecosystem are large-scale reclamation of land near estuaries, swamps, marshes and mangroves for aquaculture, agriculture and dredging for navigation and establishment of industries. All these activities together reduce natural river discharges and lead to increase of untreated sewage and effluent wastes in the ecosystem. An urgent survey of the Tamil Nadu coastal ecosystem should be carried out to pinpoint the areas of possible danger from various types of intrusion and to suggest remedial measures.

Sacred groves and heritage trees of Tamil Nadu are venerated by the people. Hence, the groves of mixed vegetation, especially near temples and other holy places, have over the centuries received protection from villagers. The IBA programme also identifies some of these places based on IBA criteria. Unfortunately, over the last few decades, vandals have not spared even some of these important groves. One case in point is the grand old Banyan tree covering an area of approximately 12,000 sq. mt. in the village of Jakkeri, 20 km southeast of Hosur in Dharmapuri district which suffered extensive damage because of chopping for firewood. In addition, there is no information on its present status. An extensive survey is needed to identify such heritage sites and necessary action must be undertaken for their care and protection.

Mining and quarrying is also a serious threat face by many areas from Tamil Nadu. A number of mines can be found in the vicinity of the tiger reserves and reserve forests.

REFERENCES

Abdulali, H. (1949) Some peculiarities of avifaunal distribution in peninsular India. *Proc. Natn. Inst. Sci. India* 15: 387–393.

Alam, A., Vats, S. and Behera K.K. (2012) *Exormotheca ceylonensis* Meijer - a threatened liverwort in India, rediscovered in Palni Hills, Tamil Nadu. *JOTT* 4(5): 2593–2595.

Alfred, J.R.B. and Nandi, N.C. (2001) Wetlands: Freshwater. In: *Ecosystems of India* (eds. Alferd, J.R.B., Das, A.K., and A.K. Sanyal), ENVIS – Zool. Surv. India, Kolkata. Pp. 165–193.

Ali, S. and Ripley, S. D. (1987) *Compact Handbook of the Birds of India and Pakistan* (Second Edition). Oxford University Press, Delhi.

Ali, S. and Whistler, H. (1942–1943) The birds of Mysore. *JBNHS* 43: 130–147, 318–341, 573–595, 44: 9–26; 206–220.

Baker, E.C.S. (1922–1930) *The Fauna of British India, including Ceylon and Burma*. Second edition. London: Taylor and Francis.

Balachandran, S. (1990) Interesting bird records from Mandapam and its neighbouring islands. *JBNHS* 87: 456–457.

Balachandran, S. (1995) Shore birds of the Marine National Park in the Gulf of Mannar, Tamil Nadu. *JBNHS* 92: 303–311

Biju, S.D., Garg, S., Gururaja, K.V., Shouche Y. & Walujkar, S.A. (2014) DNA barcoding reveals unprecedented diversity in Dancing Frogs of India (*Micrixalidae, Micrixalus*): a taxonomic

revision with description of 14 new species. *Ceylon Journal of Science (Bio. Sci.)* 43 (1).

BirdLife International (2001) *Threatened birds of Asia: the BirdLife International Red Data Book*, Cambridge, UK: BirdLife International.

BirdLife International (undated) *Important Bird Areas (IBAs) in Asia: Project briefing book*. BirdLife International, Cambridge, U.K., unpublished.

BirdLife International (2014) Species factsheets. Downloaded from <http://www.birdlife.org>.

Crivelli, A.J. and Schreiber, R.W. (1984) Status of Pelecanidae. *Biol. Conserv.* 30: 147–156.

Christopher, G. (2004) Bird Survey of Kanyakumari Forest Division. Unpublished report.

Davison, W. (1883) Notes on some birds collected on the Nilghiris and in parts of Wynnaad and Southern Mysore. *Stray Feathers* 10: 329–419.

Dement'ev, G.P. and Gladkov, N.A. (1951-1954) [Ptitsy Sov'etskogo Soyuza.] Moscow: Nauka. (In: *Russian, translated in 1966-1970 as Birds of the Soviet Union*. Jerusalem: Israel Program for Scientific Translations.)

Dinakaran, S., Anbalagan, S. and Balachandran, C. (2013) A new species of caddisfly (Trichoptera: Lepidostomatidae: *Lepidostoma*) from Tamil Nadu, India. *JoTT* 5(1): 3531–3535.

Elamon, S. (2013) Greylag Goose from Koothakulam, southern Tamil Nadu. *Indian BIRDS* 8(3): 82.

Forest Survey of India (2001) State of Forest Report 2001. Ministry of Environment and Forest, Dehra Dun.

Forest Survey of India (2011) State of Forest Report 2011. Ministry of Environment and Forest, Dehra Dun.

Gokula, V. and Vijiyan, L. (1996) Birds of Mudumalai Wildlife Sanctuary, India. *Forktail* 12: 107–116.

Grimmett, R. and Inskip, C. and Inskip, T. (1998) *Birds of the Indian subcontinent*. London: A&C Black/Christopher Helm.

Harrap, S.C. and Redman, N.J. (1990) Some observations of scarce birds in Kerala and Tamil Nadu. *JBNHS* 86: 460–461.

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Volume 1: Non-passerines. Lynx Edicions, Barcelona

Gower, D.J., Rajendran, A., Nussbaum, R.A. and Wilkinson, M. (2008) A new species of *Uraeotyphlus* (Amphibia: Gymnophiona: Uraeotyphlidae of the *Malabaricus* Group. *Herpetologica* 64 (2): 235–245.

Hume, A.O and Marshall, C.H.T. (1879-1881) The game birds of India, Burmah and Ceylon, Calcutta: Published by authors.

Hume, A.O. and Oates, E.W. (1889-1890) *Nests and eggs of Indian birds*. Second edition. R. H. Porter, London.

Hussian, S.A. (1976) Occurrence of the Broad-tailed Grass Warbler [*Schoenicola platyura*] (Jerdon) on the Coromandal Coast. *JBNHS* 73: 400–401.

Islam, M.A. (1985) Ecology of the Laughing thrushes of India with special reference to the endemic species. Ph.D. thesis. University of Bombay.

Islam, M.A. and Rahmani, A.R. (2008) *Potential and Existing Ramsar Sites in India*. Indian Bird Conservation Network, Bombay Natural History Society, BirdLife International and Royal Society for the Protection of Birds. Oxford University Press, New Delhi. Pp. 592.

Kanide, S. (2013) Sighting of Chinese Pond Heron *Ardeola bacchus* from Chennai, Tamil Nadu, India. *Indian BIRDS* 8(6): 158.

Kannan, R. (1992) Yellow-throated Bulbul in Anaimalai Hills. *Newsletter for Birdwatchers*. 32(7–8): 19.

Kannan, R. (1998) Avifauna of the Anamalai Hills (western Ghats) of Southern India. *JBNHS* 95: 193–214.

Kannan, V. (2004) Survey of IBA sites in Andhra Pradesh, Karnataka and Tamil Nadu to collect baseline information on data deficient sites. Final report. Bombay Natural History Society. Pp. 45.

Karthikeyan, S. (1995) Note on the occurrence of the Yellow-throated Bulbul *Pycnonotus xantholaemus* (Jerdon) at Shevaroys, Tamil Nadu. *JBNHS* 92: 266–267.

Karthikeyan, S. and Athreya, V.R. (1993) Kashmir Redbreasted Flycatcher *Muscicapa subrufra* Hastert and Steinbacher at Ooty. *JBNHS* 89: 376–377.

Khan, M.A.R. (1980) A comparative account of the avifauna of the *Sholas* and the neighbouring plantations in the Nilgiris. *JBNHS* 75 (Supplement): 1023–1035.

Lakshminarayana, K.V., Yazdani, G.M., and Radhakrishnan, C. (2002) Western Ghats. In: *Ecosystems of India* (eds. Alferd, J.R.B., Das, A.K., and A.K. Sanyal), ENVIS – Zool. Surv. India, Kolkata. 1–40.

Manakadan, R. and Kannan, V. (2003) A Study of the Spot-billed Pelican *Pelecanus philippensis* in southern India with special reference to its conservation. Final Report, Bombay Natural History Society. Mumbai.

Manickavasagam, S. and Rameshkumar, A. (2013) Description of two new species of Encyrtidae (Hymenoptera: Chalcidoidea) from Tamil Nadu, India. *Journal of Threatened Taxa* 5(2): 3642–3645.

Manivannan, P.K. (2013) 3rd Pelagic Bird Survey from the East Coast of Tamil Nadu- August 3rd 2013 from Kasimedu Harbour, Chennai. *Madras Naturalist's Society Bulletin* 36(10): 1–2.

Ministry of Environment and Forests (1989) *Biosphere Reserves in India*, Government of India. New Delhi.

Ministry of Environment and Forests (2002) India's Ramsar Sites-A Fact File on India's Wetlands of International Importance. Government of India, WWF- India.

Ministry of Environment and Forests (2011) *Forest Survey of India Report – 2011*. Government of India. New Delhi.

Ministry of Environment and Forests (2013) *Forest Survey of India Report – 2013*. Government of India. New Delhi.

Mohanam, M. and Balakrishnan, N.P. (1991) Endangered orchids of Nilgiri Biosphere Reserve, India. In: *Proceedings of the symposium on rare, endangered and endemic plants of the Western Ghats*. Kerala Forest Department-Wildlife Wing, Thiruvananthapuram.

Muthunarayanan, K., Vasanthan, P.K., Chandrasekaran, S. and Anand, V.G.V. (2013) Occurrence of Isabelline Wheatear *Oenanthe isabellina* in Tirunelveli and Thoothukudi districts, Tamil Nadu, India. *Indian BIRDS* 8(3): 75–76.

Nagulu, V. and Rao, J.V.R. (1983) Survey of South Indian pelicanries. *JBNHS* 80: 141–143.

Nair, N.C. and Daniel, P. (1986) The floristic diversity of the Western Ghats and its Conservation: a review. *Proceedings of the Indian Academy of Sciences (Animal/Plant Sciences Supplement)* November: 127–163.

Nichols, E.G. (1937) The Kodikanal birds and how to name them. *JBNHS* 39: 812–830.

Nichols, E.G. (1943-1945) Occurrence of birds in Madura district. *JBNHS* 44: 387–407, 574–584; 45: 122–132.

Praveen, J., Jayopal, R. and Pittie, A. (2013) Notes on Indian rarities-1: Seabirds. *Indian BIRDS* 8(5): 113–125.

Phythian-Adams, E.G. (1948) Snipe on the Nilgiris /Snipe in south India. *JBNHS* 47: 744–746.

Rahmani, A.R. (2012) *Threatened Birds of India: Their Conservation Requirements*. Indian Bird Conservation Network: Bombay Natural History Society, Royal Society for the Protection of Birds and BirdLife International. Oxford University Press. Pp xvi + 864.

Ramachandran, V.S., Thomas, B., Sofiya, C. and Sasi, R. (2011) Rediscovery of an endemic plant *Caralluma diffusa* (Wight) N.E. Br. (Asclepiadaceae) from Coimbatore District, Tamil Nadu, India, after 160 years. *JoTT* 3(3): 1622–1623.

Ramakrishna and Venkataraman, K. (2001) Marine. In: *Ecosystems of India* (eds. Alferd, J.R.B., Das, A.K., and A.K. Sanyal), ENVIS – Zool. Surv. India, Kolkata. Pp. 291–315.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: the Ripley guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington, D.C. and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University, & Lynx Edicions, Washington, D.C., Michigan & Barcelona.

Robertson, A. and Jackson, M.C.A. (1992) Birds of Periyar: an aid to bird watching in the Periyar Sanctuary. Tourism and Wildlife Society of India.

Sadasivan, T.S., Govindachari, T.R., Desikachary, T.V., Ananthakrishnan, T.N., and K.C. Jayaram (2000) Kaveri Riverine system: An Environmental study. The Madras Science Foundation, Chennai.

Santharam, V. (1996) A note on the endemic Broad-tailed Grass Warbler. *JBNHS* 93: 587.

Shankar Raman, T.R. (1988) Observations on the vocalizations and display of the Broadtailed Grass Warbler (*Schoenicola platyura* (Jerdon)). *Newsletter for Birdwatchers*. 38: 6.

Stattersfield, A.J., Crosby, M.J., Long, A.J. and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, U.K.

Stoney, R.F. (1938) Woodcock, Wood Snipe, Pintail Snipe and Jack Snipe on one day! *JBNHS* 40: 331–332.

Subramanya, S., Prasad, J.N., and Karthikeyan, S. (1995) In Search of the Yellow-throated Bulbul. *Sanctuary (Asia)* 15(5): 68–70.

Sugathan, R. (1983) Some interesting aspects of the avifauna of the Point Calimere Sanctuary, Thanjavur District, Tamil Nadu. *JBNHS* 79: 567–575.

Sugathan, R. (1985) Observations on Spoon-billed Sandpiper (*Eurynorhynchus pugmeus*) in its wintering ground at Point Calimere, Thanjavur District, Tamil Nadu. *JBNHS* 82: 407–508.

Tamil Nadu Forest Department (2014): <http://www.forests.tn.nic.in/indexb.html> (As accessed on August 11, 2014).

Tomkovich, P.S. (1991) Three-year study of the Spoon-billed Sandpiper. *Asian Wetland News* 4: 17.

Vasudevan, K., Kumar, A., and Chellam, R. (2001) Structure and composition of rainforest floor amphibian communities in Kalakad-Mundanthurai Tiger Reserve. *Current Science* 80: 406–412.

Vijayan, L., Prasad, S.N., Balasubramanian, P., Gokula, V., Ramachandran, N.K., Stephen, D. and Mahajan, M.V. (1999) Impact of human interference on the plant and bird communities in the Nilgiri Biosphere Reserve. SACON Research Report: Final Report. Pp. 145.

Vijayan, L., Gokula, V. and Prasad, S.N. (2000) A Study of the population and habitat of the Rufous-breasted Laughingthrush *Garrulax cachinnans*. Final Report. Sálim Ali Centre for Ornithology and Natural History, Coimbatore.

Williams, J. (1937) Game birds in the Anaimalai hills and the south Coimbatore district. *JBNHS* 39: 732–740.

Zacharias, V.J. and Gaston, A.J. (1999) The recent distribution of endemic, disjunct and globally uncommon birds in the forests of Kerala state, South-West India. *Bird Conservation International* 9: 191–225.

Zarri, A.A. (2005) Ecology of Nilgiri Laughingthrush (*Garrulax cachinnans*) in Nilgiris, Western Ghats. Ph.D. Thesis. Submitted to University of Mumbai, Mumbai. Pp. 156.

Zarri, A.A. and Rahmani, A.R. (2004) Wintering records, ecology and behaviour of Kashmir Flycatcher *Ficedula subrubra* (Hartert and Steinbacher). *JBNHS* 101(2): 261–268.

Zarri, A.A., Rahmani, A.R. and Senthilmurugam, B. (2008a) Birds of the Upper Nilgiri Plateau, Western Ghats, India. *JBNHS* 105(2): 181–195.

Zarri, A.A., Rahmani, A.R., Singh, A. and Kushwaha, S.P.S. (2008b) Habitat suitability assessment for the endangered Nilgiri Laughingthrush: A multiple logistic regression approach. *Curr. Sci.* 94 (11): 1487–1494.

AVALANCHE (NILGIRIS)

IN-TN-01

IBA Site Code	: IN-TN-01
Administrative Region	: Tamil Nadu
State	
District	: Nilgiris (South Forest Division)
Coordinates	: 11° 17' 56" N, 76° 35' 30" E
Ownership	: State
Area	: 7,846 ha

Altitude	: 2,200 msl
Rainfall	: 1,400 mm
Temperature	: 7 °C to 18 °C
Biogeographic Zone	: Western Ghats
Habitats	: Montane Grassy Slopes, Tropical Secondary Scrub, Tropical Grassland

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats), A3 (Biome 10: Indian Peninsula Tropical Moist Forest)

PROTECTION STATUS: Not officially protected.

MAP NOT AVAILABLE

GENERAL DESCRIPTION

Avalanche, a part of the Nilgiri Hills, lies in the extreme northwest of Tamil Nadu, on the interstate boundaries connecting with Karnataka and Kerala. The Avalanche Reserve Forest encompasses an area of 7,846 ha. The terrain is undulating with a few remnant patches of grassland and Montane Evergreen Forests (*sholas*), the latter confined to the folds of hills and depressions.

There are numerous streams draining into the reservoirs of the Massanjore (or Canada) and Emerald Dams that have submerged a considerable area. The climate is generally cool throughout the year, with frost formation mainly during November and December.

This site forms one of the key areas for the conservation of many endemics and Threatened bird species of the Western Ghats, such as the Rufous-breasted or Black-chinned (Nilgiri) Laughingthrush *Strophocincla cachinnans*. Increasing anthropogenic pressure from the nearby settlements is a cause of concern for this IBA. The vegetation cover mainly constitutes monoculture plantations of exotics Wattle *Acacia mearnsii*, Blue Gum *Eucalyptus globosus*, and Pine *Pinus patula*. The vegetation can be classified into three major types, namely Southern Montane Wet Temperate Forest (*shola*), grasslands, and exotic plantations. Details of the flora are included in the authoritative works of Gamble (1915–25) and Fyson (1915–20).

Southern Montane Wet Forests classified by Champion & Seth (1968), generally found above 1,800 m, are common in Avalanche and consist of medium-sized evergreen trees up to 20 m. Such forest patches usually occur as a rule at the heads of streams in the folds of converging slopes and include species of both tropical and temperate regions. Several genera of distinctly Himalayan origin such as *Rhododendron*, *Hypericum*, *Rubus*, *Lonicera*, *Gaultheria*,

and *Pittosporum* are common. Over the past hundred years, *sholas* have been converted to monoculture plantations or tea estates, and this continued up to the late 1970s. Now, fortunately, this has been stopped and the remnant *sholas* have been protected.

Grasslands in the Avalanche Reserve Forest were the worst affected by plantations, as a result of which hardly any undisturbed grassland remains. Fragments of grasslands are seen between the mosaic of plantations and the shola forest patches. During monsoon, the natural grasslands harbour many species of Balsam and Orchids, some rare and endemic.

Systematic plantation of exotic species began in 1953 covering about 70% of this IBA; largely Wattle, Eucalyptus, Pine and Tea were planted. Plantation is proportionally the largest vegetation type in Avalanche. Thickets of Wattle and stands of Pine are seen everywhere. Tea plantations are mainly found in the area from Murlimunth towards Emerald village.

AVIFAUNA

This is one of the most important bird areas in the Nilgiris. The *shola* forests in this IBA harbour several endemic and habitat-specialist bird species such as the Black-chinned (Nilgiri) Laughingthrush, Nilgiri Blue Robin *Myiomela major* and Nilgiri Wood-pigeon *Columba elphinstonii*. Grassland species of conservation interest include the Nilgiri Pipit *Anthus nilghiriensis*, which is a common species in suitable habitats in the IBA. The remnant grasslands also provide foraging ground to many raptors such as the Common Buzzard *Buteo buteo*, White-eyed Buzzard *Butastur teesa*, Common Kestrel *Falco tinnunculus*, and Black-shouldered Kite *Elanus caeruleus*, to name a few. The Common Kestrel breeds in this IBA.

ENDANGERED

Black-chinned (Nilgiri)	<i>Strophocincla cachinnans</i>
Laughingthrush	
Nilgiri Blue Robin	<i>Myiomela major</i>

VULNERABLE

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Kashmir Flycatcher	<i>Ficedula subrubra</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>

NEAR THREATENED

Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Black-and-Rufous Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudata</i>

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Nilgiri Imperial-pigeon	<i>Ducula cuprea</i>
Grey-fronted Green-pigeon	<i>Treron affinis</i>
Malabar Parakeet	<i>Psittacula columboides</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Flame-throated Bulbul	<i>Pycnonotus gularis</i>
Nilgiri Blue Robin	<i>Myiomela major</i>
Black-chinned (Nilgiri)	<i>Strophocincla cachinnans</i>
Laughingthrush	
Black-and-rufous Flycatcher	<i>Ficedula nigrorufa</i>
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>
Nilgiri Flycatcher	<i>Eumyias albicaudata</i>
Small Sunbird	<i>Leptocoma minima</i>
Malabar Barbet	<i>Psilopogon malabarica</i>
Nilgiri Thrush	<i>Zoothera neilgherriensis</i>
Nilgiri Flowerpecker	<i>Dicaeum concolor</i>
Malabar Woodshrike	<i>Tephrodornis sylvicola</i>
Malabar Starling	<i>Sturnia blythii</i>

BIOME 10: INDIAN PENINSULA TROPICAL MOIST FOREST

White-cheeked Barbet	<i>Megalaima viridis</i>
Indian Scimitar-babbler	<i>Pomatorhinus horsfieldii</i>

The plantations in this IBA are the least important habitat type, and support mainly generalist species such as Cinereous Tit *Parus cinereus*, Oriental White-eye *Zosterops palpebrosus*, and warblers in winter (Zarri *et al.* 2002). The wattle plantation in Avalanche also supports a small wintering population of the Kashmir Flycatcher *Ficedula subrubra*. During a survey of this species in the Nilgiris Upper Plateau, 12 of the 16 birds sighted altogether were recorded from this IBA by Zarri & Rahmani (2004). The Woodcock *Scolopax rusticola*, which was once a prized game bird, has severely declined over the last few decades in most parts of its range in India. It is still found in Avalanche, but is an extremely rare winter visitor.

The water reservoir in this IBA is devoid of vegetation, and supports no significant bird species except a few Common Sandpiper *Actitis hypoleucus* and Great Cormorant *Phalacrocorax carbo*. Fish fauna is limited to two species,

one of them a highly prized game fish, Rainbow Trout *Salmo gairdneri*, which was successfully introduced here in 1911, to the detriment of many endemic species.

The site lies in the Western Ghats Endemic Bird Area (EBA123), where Stattersfield *et al.* (1998) had listed 16 restricted-range species. After recent taxonomic changes (Rasmussen & Anderton 2005, 2012; del Hoyo & Collar 2014), 26 bird species are now endemic to the Western Ghats. Eighteen of them are found in this IBA. Many restricted-range species associated with Wet Temperate Sholas and Subtropical Broadleaf Hill Forest (Stattersfield *et al.* 1998) are found, which proves that some shola habitat is still available despite extensive plantation in the past. The occurrence of such species also necessitates further protection of the site.

Avalanche is located in Biome 10 (Indian Peninsula Tropical Moist Forest). Fifteen species represent this biome. Only two species, the White-cheeked Barbet *Megalaima viridis* and Indian Scimitar-babbler *Pomatorhinus horsfieldii* have been recorded to date. The Indian Scimitar-babbler is very widely distributed, so it may not be the best example of the birds of this biome.

The site is an important wintering area for many birds that are listed in other biomes, such as Tickell's Leaf-warbler *Phylloscopus affinis*, Large-billed Leaf-warbler *Phylloscopus magnirostris*, Brown-breasted Flycatcher *Muscicapa muttui*, Blue-headed Rock-thrush *Monticola cinclorhynchus*, and Indian Blue Robin *Luscinia brunnea*.

OTHER KEY FAUNA

Troops of Nilgiri Langur *Trachypithecus johni* are frequently seen all through this IBA, while Bonnet Macaque *Macaca radiata* is occasionally present near the settlements. Among the large cats, Tiger *Panthera tigris* and Leopard *P. pardus* are sighted, the leopard being more frequent. Several other small mammals such as Jungle Cat *Felis chaus*, Brown Palm Civet *Paradoxurus jerdoni*, Striped-necked Mongoose *Herpestes vitticollis*, and Common Mongoose *Herpestes edwardsii* have also been recorded. Packs of Wild Dog *Cuon alpinus*, and Golden Jackal *Canis aureus* are also seen. Nilgiri Marten *Martes gwatkinsii* is rarely seen, perhaps because of its elusive behaviour. Among the herbivores, Sambar *Rusa unicolor* and Barking Deer *Muntiacus muntjak* are fairly common, while Nilgiri Tahr *Nilgiritragus hylocrius* can also be sighted near cliffs.

LAND USE

- Forestry
- Plantation

THREATS AND CONSERVATION ISSUES

- Invasive species
- Construction of dam/dykes/Barrage



V. KANNAN

The construction of dams in the mid 1960s had a severe negative impact on the ecology of this IBA by submerging important wildlife habitats in the valleys, and indirectly by blocking wildlife movement

Ecologically, this IBA is most affected by large-scale plantations, like the rest of the Upper Nilgiri Hills. Wattle regenerates through seeds, forming impenetrable thickets, which interfere with wildlife movement. Another serious but little recognized problem in this site area is the rapid invasion of grasslands by Scotch Broom *Cytisus scoparius*. Given the alarming rate of its spread, the already scarce grassland habitat and its specialist avifauna are under threat. Growing tourism, tree felling and firewood collection are other problems. The construction of dams in the mid 1960s had a severe negative impact on the ecology by submerging important wildlife habitats in the valleys, and indirectly by blocking wildlife movement paths. Pressure has mounted on the remaining forests from the new settlements that have come up owing to the presence of dams.

KEY CONTRIBUTOR

Ashfaq Ahmed Zarri

KEY REFERENCES

Champion, H.G. and Seth, S.K. (1968) *A Revised Survey of Forest Types of India*. Govt. of India Press, Delhi.

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Vol. 1: Non-passerines. Lynx Edicions, Barcelona.

Fyson, R.F. (1915–20) *The Flora of the Nilgiris and Pulney Hill-tops*. Vol. 1. Superintendent, Government Press, Madras.

Gamble, J.S. (1915–25) *Flora of the Presidency of Madras*. Botanical Survey of India, Calcutta.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington, D.C. and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2, 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan, State University, and Lynx Edicions, Washington, D.C., Michigan and Barcelona.

Stattersfield, A.J., Crosby, M.J., Long, A.J. and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK. Pp. 846.

Zarri, A.A., Rahmani, A.R., and Senthilmurugan, S. (2002) Ecology of Shola and Alpine Grasslands. Annual Report 2. Part 1. Bombay Natural History Society, Mumbai.

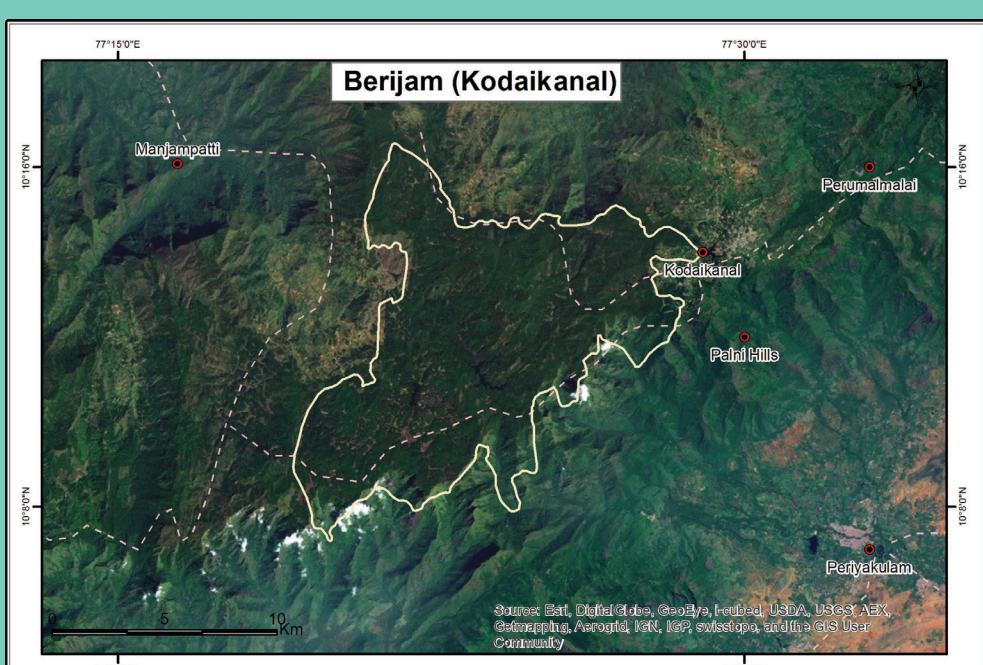
Zarri, A.A., and Rahmani, A.R. (2004) Wintering records, ecology and behaviour of Kashmir Flycatcher *Ficedula subrubra* (Hartert & Steinbacher). *JBNHS* 101: (2) 261–268.

BERIJAM (KODAIKANAL)

IBA Site Code	: IN-TN-02	Rainfall	: 1,200–1,700 mm
Administrative Region State	: Tamil Nadu	Temperature	: 5 °C to 23 °C
District	: Dindigul	Biogeographic Zone	: Western Ghats
Coordinates	: 10° 10' 60" N, 77° 24' 00" E	Habitats	: Tropical Dry Evergreen Forest, Tropical Semi-evergreen Forest, Tropical Secondary Scrub
Ownership	: State		
Area	: 62,000 ha		
Altitude	: 1,500–2,654 msl		

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats)

PROTECTION STATUS: Not officially protected. (Part of Kodaikanal Wildlife Sanctuary protected since September 20, 2013 except Berijam Lake and Berijam Staff Quarters)



GENERAL DESCRIPTION

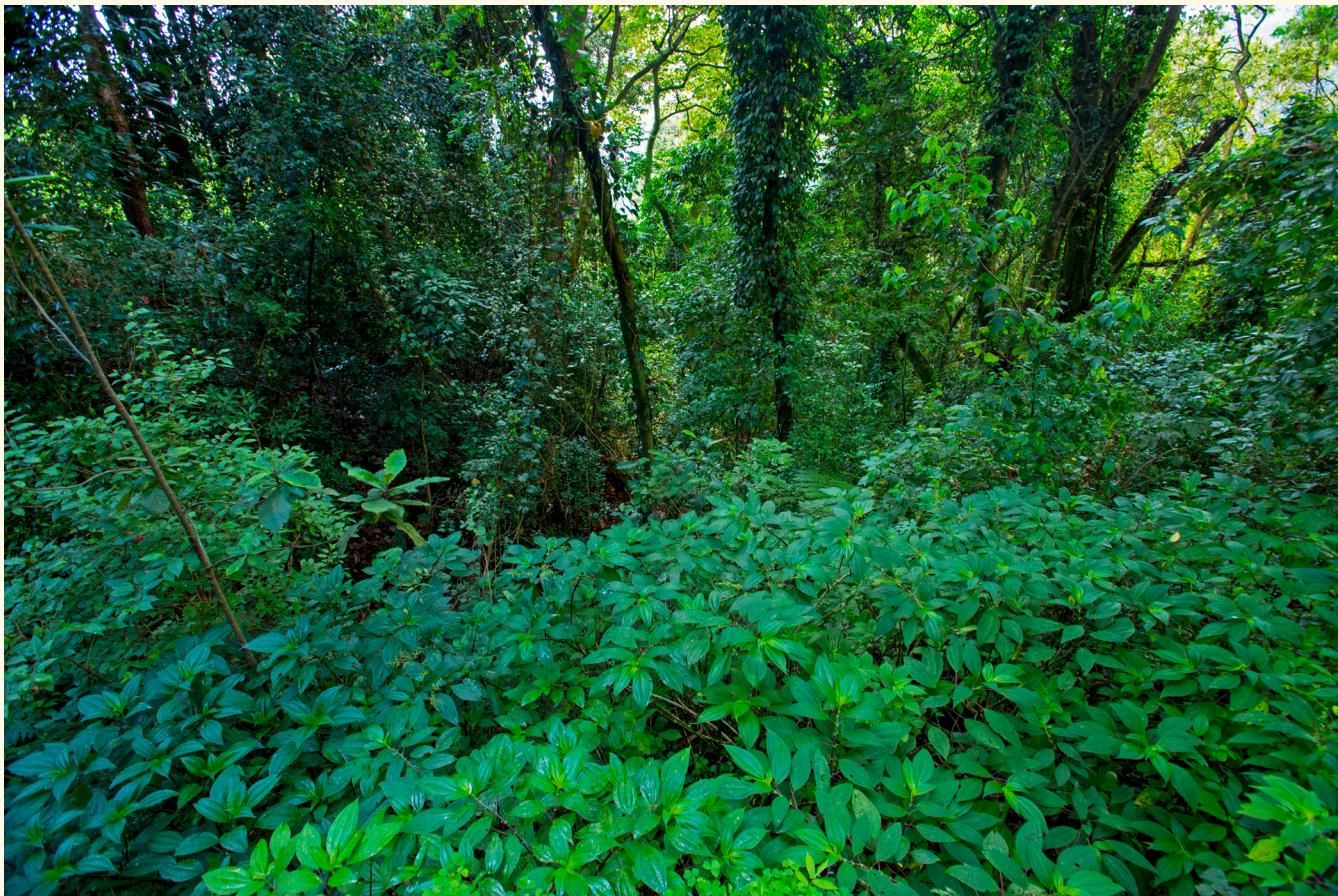
Berijam, situated 23 km west of Kodaikanal, holds the largest area of *shola* and evergreen forests of the Palni Hills. There is a semi-natural lake in the middle of Berijam forest (Balachandran *in litt.* 2003). Both Berijam and Vandaravu forest ranges have two reserve forests each, which extend over an area of *c.* 6,200 ha. The important Mathikettan (271 ha) and Marian Sholas are situated here. Vandaravu Peak (2,654 m), which is situated on the border of Tamil Nadu and Kerala states, is the highest peak of the area. The Kodaikanal-Munnar road passes through Berijam and Vandaravu.

This undulating plateau bears grasslands interspersed with wooded *sholas*. The grasslands have been extensively planted with Wattle, Blue Gum, Pine, and *Alnus*. Due to provision from the nurseries of the Forest Department

to grow indigenous high altitude trees of the Palni Hills, *shola* species thrive on the campuses of several enlightened Kodaikanal institutions and in private gardens. The Forest Department is replacing old plantations with native *shola* forest species such as *Elaeocarpus glandulosus*, *Syzygium densiflora*, *Neolitsea scrobiculata*, and *Michelia nilagirica*. There is a proposal to declare a wildlife sanctuary in the Upper Palnis, which will also include this IBA site.

AVIFAUNA

The Bombay Natural History Society has been conducting bird ringing in the Upper Palni Hills including Berijam since 1970, and 94 species of birds have been identified. Almost all the high altitude endemics of the Western Ghats have been seen and/or ringed here. Interestingly, the Nilgiri



In Kodaikanal the grasslands have been extensively planted with Wattle, Blue gum, Pine and Alnus, but some natural shola forest still survives

Wood-pigeon *Columba elphinstonii*, which was uncommon till the mid 1980s, has now become quite regular. It has also been found to breed in the Upper Palnis (Balachandran *et al.* 2003). The increase in other endemic species such as White-bellied Blue Robin *Myiomela albiventris*, Black-and-Orange Flycatcher *Ficedula nigrorufa*, and Nilgiri Flycatcher *Eumyias albicaudatus* was discovered during bird banding studies carried out at the neighbouring Poomparai, another IBA, from 1970 to 2003 (Balachandran *et al.* 2003). However, the Vulnerable Nilgiri Pipit *Anthus nilghiriensis* has decreased in number, mainly due to the plantation of exotic trees in the grasslands.

Earlier, 16 species were considered endemic to the Western Ghats (Stattersfield *et al.* 1998), seven of which were reported from this IBA site. But now, based on taxonomic changes (Rasmussen & Anderton 2005, 2012; del Hoyo & Collar 2014), 26 species of birds are found to be endemic to the Western Ghats. Out of these, 17 have been reported from this site, and more are likely to be found.

Among biome restricted species, of the 15 Biome 10 (Indian Peninsula Tropical moist Forest) species identified by BirdLife International (undated), only four are found here: White-cheeked Barbet *Megalaima viridis*, Malabar

Whistling-thrush *Myophonus horsfieldii*, Indian Scimitar-babbler *Pomatorhinus horsfieldii*, and Black-throated Munia *Lonchura kelaarti* (Balachandran *et al.* 2003).

This site has been selected on the basis of the presence of globally Threatened species, a significant percentage of restricted-range species, and some biome restricted species.

OTHER KEY FAUNA

The major predator is Leopard *Panthera pardus*. There have been some unconfirmed records of Tiger *Panthera tigris* also. The ungulates include Gaur *Bos gaurus*, Sambar *Rusa unicolor*, Barking Deer *Muntiacus muntjak*, and Wild Boar *Sus scrofa*. The Gaur population is quite healthy and increasing (S. Balachandran, *pers. comm.* 2003). Wild Dog *Canis lupus* has also increased due to good protection. Indian Giant Squirrel *Ratufa indica* is found in all suitable forest patches.

In April 2002 and 2004, Nilgiri Marten *Martes gwatkinsii* was found for the first time in the Berijam forests (Krishna & Karnad 2010).

LAND USE

- Forestry



VINAYAK YARDI

Nilgiri Flycatcher *Eumyias albicaudatus* is one of the Western Ghats endemics that is found in Kodaikanal

THREATS AND CONSERVATION ISSUES

- Invasive species
- Plantation
- Developmental activities

This IBA site is relatively well protected, as grazing and firewood collection pressure is low. The natural forests are now surrounded by forest plantations and entry is restricted. Villagers get their fuel requirements from the Wattle plantations.

The only real threat is the spread of the invasive Scotch Broom *Cystisus scoparius* in most of the remaining grasslands. The area of reserve forests in the Kodaikanal Division is dwindling gradually due to handing over of the forested land to various departments, both State as well as Central Government, for other purposes such as establishing apple orchard, Bee Research Station, Sheep Breeding Research Station, and various irrigation projects. The Sheep Research Centre (Mannavanur) has taken over 801 ha.

Land was allotted to construct the Lord Murugan Temple at Berijam. In addition, the public has been given right of way, access to a temple, right to take water, build streams and to construct roads and channels. The IBA is further threatened by the construction of large scale holiday resorts and luxury hotels. These indiscriminate human activities pollute the lake through the discharge of waste water and dumping of wastes, thus deteriorating the lake ecosystem.

ENDANGERED

White-bellied Blue Robin *Myiobius albiventris*

VULNERABLE

Nilgiri Wood-pigeon *Columba elphinstonii*

Nilgiri Pipit *Anthus nilghiriensis*

NEAR THREATENED

Palni Laughingthrush *Streptocincla fairbanki*

Black-and-Orange Flycatcher *Ficedula nigrorufa*

Grey-headed Bulbul *Microtarsus priocephalus*

Nilgiri Flycatcher *Eumyias albicaudatus*

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon *Columba elphinstonii*

Nilgiri Imperial-pigeon *Ducula cuprea*

Grey-fronted Green-pigeon *Treron affinis*

Malabar Parakeet *Psittacula columboidea*

Nilgiri Pipit *Anthus nilghiriensis*

Flame-throated Bulbul *Pycnonotus gularis*

White-bellied Blue Robin *Myiobius albiventris*

Palni Laughingthrush *Streptocincla fairbanki*

Black-and-Orange Flycatcher *Ficedula nigrorufa*

White-bellied Blue-flycatcher *Cyornis pallipes*

Nilgiri Flycatcher *Eumyias albicaudatus*

Small Sunbird *Leptocoma minima*

Malabar Barbet *Psilopogon malabarica*

Nilgiri Thrush *Zoothera neilgherriensis*

Nilgiri Flowerpecker *Dicaeum concolor*

Malabar Woodshrike *Tephrodornis sylvicola*

Malabar Starling *Sturnia blythii*

KEY CONTRIBUTOR

S. Balachandran

KEY REFERENCES

Balachandran, S., Rahmani, A.R., and Ezhilarsi, N. (2003) Revaluation of Bird Community Structure of Palni Hills, with Special Reference to Threatened and Endemic Species. Annual Report 2002–2003. Bombay Natural History Society, Mumbai. Pp. 26.

BirdLife International (undated) *Important Bird Areas (IBAs) in Asia: Project Briefing Book*. BirdLife International, Cambridge, UK. Unpubl.

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Vol. 1: Non-passerines. Lynx Edicions, Barcelona.

Krishna, Y.C and Karnad, D. (2010) New records of the Nilgiri Marten *Martes gwatkinsii* in Western Ghats, India. *Small Carnivore Conservation* 43: 23–27.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington, D.C. and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2, 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University, and Lynx Edicions, Washington, D.C., Michigan, and Barcelona.

Stattersfield, A.J., Crosby, M.J., Long, A.J. and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK. Pp. 846.

BIG TANK (PERIA KANMAI) AND SAKKARAKOTAI KANMAI

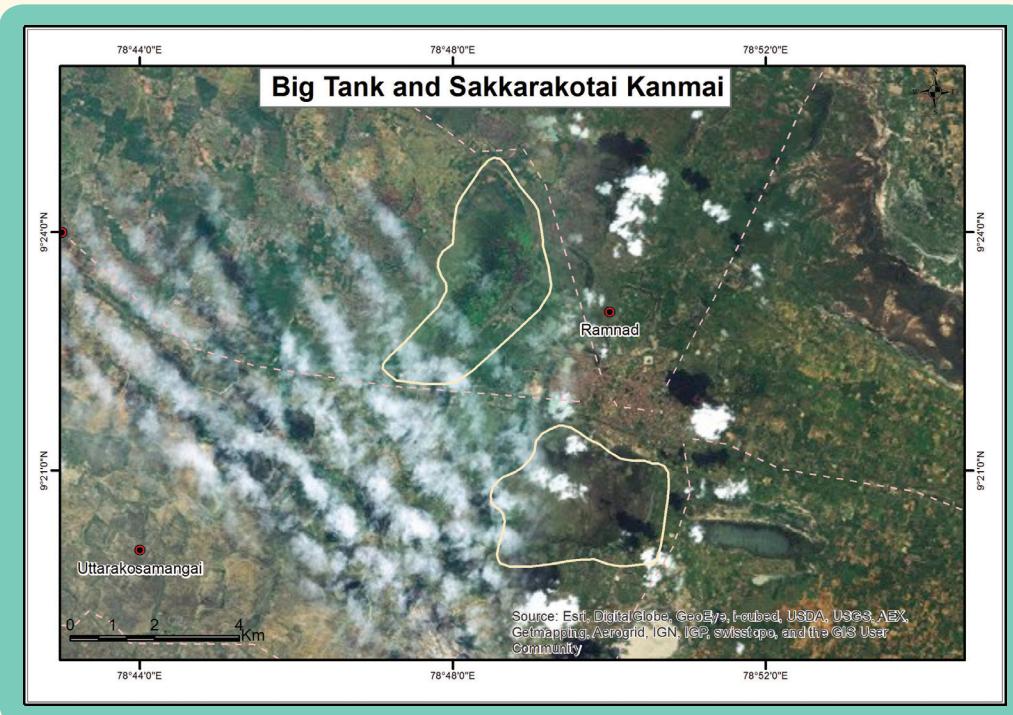
IN-TN-03

IBA Site Code	: IN-TN-03
Administrative Region (State)	: Tamil Nadu
District	: Ramanathapuram
Coordinates	: 09° 22' 00" N, 78° 52' 00" E
Ownership	: State (Irrigation Dept.)

Area	: 2,541 ha
Altitude	: c. 2 msl
Rainfall	: Not available
Temperature	: 22 °C to 37 °C
Biogeographic Zone	: Coasts
Habitats	: Freshwater Reservoir

IBA CRITERIA: A1 (Threatened species), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS: Not officially protected



GENERAL DESCRIPTION

Big Tank or Peria Kanmai (System Tank, 891 ha) and Sakkarakottai Kanmai (Non-system Tank, 1,650 ha) are twin wetlands of great importance for bird conservation, although they were initially built to provide irrigation and drinking water. Peria Kanmai is fed by the River Vaigai and Sakkarakottai Kanmai is rainfed. These wetlands are located 5 km north of the district headquarters at Ramanathapuram.

Islam & Rahmani (2008) noted that the Big Tank or Peria Kanmai and Sakkarakottai Kanmai qualify on the basis of three criteria for Ramsar status: Ramsar Criteria 2 (wetland supports threatened ecological communities), Criteria 5 (wetland regularly supports 20,000 or more waterbirds), and Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies). This site comes under Ramsar Wetland Type 6 (water storage reservoir).

The wetlands are rich in aquatic flora, especially *Scirpus* sp., *Cyperus pygmaeus*, *Cyperus difformis*, and *Cynodon dactylon*. *Ipomoea carnea* can be seen in dense stands on the periphery.

AVIFAUNA

This site has been selected as an IBA based on the large numbers of congregatory waterfowl, and especially as a nesting site for the Near Threatened Spot-billed Pelican *Pelecanus philippensis*. The wetlands began to attract waterfowl immediately after the completion of the dams. Many birds started nesting on the numerous *Acacia nilotica* trees found inside the tanks. Significant numbers of heronry species such as the Grey Heron *Ardea cinerea*, Purple Heron *Ardea purpurea*, cormorants *Phalacrocorax* spp., Cattle Egret *Bubulcus ibis*, Little Egret *Egretta garzetta*, and Large or Great Egret *Casmerodius albus*

nest there. Eurasian Coot *Fulica atra* is also seen breeding in these wetlands. A small number of 35–40 Spot-billed Pelican were found breeding. Balachandran (*pers. comm.* 2003) has noted that the pelicans shift their nesting site between these two wetlands, depending upon the availability of water.

The Big Tank (Peria Kanmai) is close to the Gulf of Mannar, from where Greater Flamingo *Phoenicopterus roseus* frequent this lake in thousands when the water level is low (S. Balachandran, *pers. comm.* 2002). During the Annual Waterfowl Count in 2002, nearly 1,600 were sighted. A very large congregation of ducks is also seen. At one time, there may not be as many as 20,000 birds (A4iii criteria), but in a whole year more than 20,000 birds use these wetlands.

These tanks also attract many species listed as Near Threatened by BirdLife International (2014). According to Balachandran (*pers. comm.* 2003), on April 25, 2002, 1,800 Black-headed Ibis *Threskiornis melanocephalus*, 250 Red-naped Ibis *Pseudibis papillosa*, 1,300 Glossy Ibis *Plegadis falcinellus*, 1,500 Painted Stork *Mycteria leucocephala*, and 2,000 Little Egret *Egretta garzetta* were seen, along with other waterbirds. The numbers were much more than the 1% mentioned by Wetlands International (2012).

OTHER KEY FAUNA

As these wetlands are surrounded by human habitation, there is not much large terrestrial fauna, except for an occasional Golden Jackal *Canis aureus*.

LAND USE

- Cultivation of vegetables on the banks
- Fishing

THREATS AND CONSERVATION ISSUES

- Illegal snail collection
- Poaching of ducks
- Collection of eggs and chicks
- Illegal tree cutting

These wetlands are under the control of the Irrigation Department, but the Forest Department has control on the wildlife. Illegal collection of bird eggs and chicks still occurs,



VINAYAK YARDI

Nearly 1,800 Black-headed Ibis *Threskiornis melanocephalus*, a Near Threatened species, have been sighted in this IBA

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>

though not to the same extent as before. Effluents from a hospital pollute the water of Sakkarakotai Kanmai. This needs to be stopped at once. Attempts should be made to involve villagers and students in the conservation of birds. Environmental awareness programmes to highlight the role of guano-rich water in increasing the fertility of the crop fields should be taken up.

If the villagers agree, these tanks should be considered as Community Conservation Areas, under the amended Indian Wildlife (Protection) Act, 1993.

KEY CONTRIBUTORS

S. Balachandran, S.S. Ramchandran Raja, V. Kannan.

KEY REFERENCES

BirdLife International (2014) Species factsheet. Downloaded from <http://www.birdlife.org> (As accessed in December 2014).

Islam, M.Z. and Rahmani, A.R. (2008) *Potential and Existing Ramsar Sites in India*. Indian Bird Conservation Network: Bombay Natural History Society, BirdLife International and Royal Society for the Protection of Birds. Oxford University Press, Mumbai, Pp. 592.

Wetlands International (2012) *Waterbirds Population Estimates: Fifth Edition*. Wetlands International Global Series No. 12. Wageningen, The Netherlands. (online version).

BISON SWAMP (NILGIRIS)

IBA Site Code	: IN-TN-04	Altitude	: 2,300 msl
Administrative Region (State)	: Tamil Nadu	Rainfall	: 1,400 mm
District	: Nilgiris (South Forest Division)	Temperature	: 9 °C to 22 °C
Coordinates	: 11° 12' 52" N, 76° 31' 41" E	Biogeographic Zone	: Western Ghats
Ownership	: State	Habitats	: Montane Wet Temperate Forest, Tropical Grassland, Tropical Secondary Scrub
Area	: 12 ha		

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats)

PROTECTION STATUS: Not officially protected.

MAP NOT AVAILABLE

GENERAL DESCRIPTION

Bison Swamp is located at the southwest end of Nilgiris district, Tamil Nadu, very close to the Kerala border. It is a part of the Korakundah Range of the Nilgiris South Forest Division. Francis (1908) in the Nilgiri Gazetteer describes the origin of its name, from the congregation of Indian Bison or Gaur *Bos gaurus*, which the early settlers often hunted. During the last century, Bison Swamp experienced extensive habitat changes affecting its specialist flora and fauna. It was extensively planted with exotics such as *Eucalyptus globosus* and Wattle *Acacia mearnsii*. A very small proportion of natural shola forest and grassland remains. Despite habitat loss and degradation, this IBA is still important for the conservation of endemic and Threatened birds such as the Black-chinned (Nilgiri) Laughingthrush *Strophocincla cachinnans*.

Natural vegetation of this site can be classified into two major types, namely Southern Montane Wet Temperate Forest (shola), and Grasslands. Both have been converted into plantations. Patches of grasslands between the plantations and shola patches remain in Bison Swamp. Plantations of Wattle and Eucalyptus now occupy a major portion of Bison Swamp. Wattle forms impenetrable thickets, severely affecting the movement of larger mammals. It regenerates and spreads quickly, and may be termed invasive.

AVIFAUNA

Bison Swamp was once home to a wintering population of Wood Snipe *Gallinago nemoricola* and Eurasian Woodcock *Scolopax rusticola*, but these species have become rare as game birds owing to severe hunting pressure, during the early decades of the 20th century, followed by habitat degradation. The shola forests around the swamp harbour a number of Western Ghats endemics and habitat specialists such as Black-chinned (Nilgiri) Laughingthrush, Nilgiri Wood-pigeon *Columba elphinstonii*, Nilgiri Flycatcher

Eumyias albicaudatus, Nilgiri Pipit *Anthus nilghiriensis*, Black-and-Orange Flycatcher *Ficedula nigrorufa* and Small Sunbird *Nectarinia minima*, among others. The details of birds seen around this site are given by Zarri *et al.* (2002).

Based on recent taxonomic changes (see Rasmussen & Anderton 2005, 2012; del Hoyo & Collar 2014), 26 species of birds are endemic to the Western Ghats, out of which 17 have been reported from the shola forests of the Bison Swamp.

The biome species recorded in this IBA are: Tickell's Leaf-warbler *Phylloscopus affinis* (Biome 5: Eurasian High Montane); Large-billed Leaf-warbler *Phylloscopus magnirostris*, and Indian Blue Robin *Luscinia brunnea* (Biome 7: Sino-Himalayan Temperate Forest); Black Bulbul *Hypsipetes leucocephalus* (Biome 8: Sino-Himalayan Subtropical Forest); White-cheeked Barbet *Megalaima viridis* and Indian Scimitar-babbler *Pomatorhinus horsfieldii* (Biome 10: Indian Peninsula Tropical Moist Forest), and Common Indian Nightjar *Caprimulgus asiaticus*, White-eyed Buzzard *Butastur teesa*, Painted Bush-quail *Perdicula erythrorhyncha*, White-browed Fantail *Rhipidura aureola*, Black-rumped Flameback *Dinopium benghalense*, and Ashy Prinia *Prinia socialis* (Biome 11: Indo-Malayan Tropical Dry Zone).

OTHER KEY FAUNA

Ironically enough, the Indian Bison or Gaur has become uncommon in Bison Swamp! Only a few are seen, during the monsoon. Both Tiger *Panthera tigris* and Leopard *P. pardus* are frequently seen in this IBA, their prey Sambar *Rusa unicolor* and Barking Deer *Muntiacus muntjak* being fairly common. Asiatic Elephants *Elephas maximus* cross through this area, like many other IBAs of the Nilgiris, during their annual migration from Silent Valley to the Wayanad Plains. Other mammals include Jungle Cat *Felis chaus*, Brown Palm Civet *Paradoxurus jerdoni*,

IN-TN-04



SANDEEP DAS

© Sandeep Das

Nilgiri Laughingthrush, now known as Black-chinned Laughingthrush
Strophocincla cachinnans, is found in this IBA

ENDANGERED

Black-chinned (Nilgiri) Laughingthrush	<i>Strophocincla cachinnans</i>
Nilgiri Blue Robin	<i>Myiomela major</i>

VULNERABLE

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>

NEAR THREATENED

Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Nilgiri Imperial-pigeon	<i>Ducula cuprea</i>
Grey-fronted Green-pigeon	<i>Treron affinis</i>
Malabar Parakeet	<i>Psittacula columbooides</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Flame-throated Bulbul	<i>Pycnonotus gularis</i>
White-bellied Blue Robin	<i>Myiomela albiventris</i>
Black-chinned (Nilgiri) Laughingthrush	<i>Strophocincla cachinnans</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>
Small Sunbird	<i>Leptocoma minima</i>
Malabar Barbet	<i>Psilopogon malabarica</i>
Nilgiri Thrush	<i>Zoothera neilgherriensis</i>
Nilgiri Flowerpecker	<i>Dicaeum concolor</i>
Malabar Woodshrike	<i>Tephrodornis sylvicola</i>
Malabar Starling	<i>Sturnia blythii</i>

BIOME 10: INDIAN TROPICAL MOIST PENINSULA

White-cheeked Barbet	<i>Megalaima viridis</i>
Indian Scimitar-babbler	<i>Pomatorhinus horsfieldii</i>

Striped-necked Mongoose *Herpestes vitticollis*, Common Mongoose *Herpestes edwardsi*, Wild Dog *Cuon alpinus*, Golden Jackal *Canis aureus*, Nilgiri Langur *Trachypithecus johni*, and Wild Boar *Sus scrofa*. Nilgiri Marten *Martes gwatkinsi* may also be present, but there is no recent record.

LAND USE

- Plantation
- Forestry operations

THREATS AND CONSERVATION ISSUES

- Invasive species
- Grazing
- Firewood collection
- Poaching

The key conservation problem that has changed the ecological landscape of this area is conversion of its natural habitats into exotic plantations. Commercial timber harvesting is another major problem. Remnant grassland patches are vulnerable to burning during summer.

As Bison Swamp is on the border between Tamil Nadu and Kerala, there is a lot of illegal cultivation of *Cannabis sativa* (Ganja). Animal poachers also take advantage of its remoteness, tough terrain, and inaccessibility. Inclusion of this site in the proposed expansion of Mukurthi National Park may save it from further exploitation. There is an urgent need to stop the degradation of natural habitats around Bison Swamp.

KEY CONTRIBUTORS

Ashfaq Ahmed Zarri, Asad R. Rahmani.

KEY REFERENCES

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Vol. 1: Non-passerines. Lynx Edicions, Barcelona.

Francis, W. (1908) The Nilgiris – Madras District Gazetteer, Government Press, Madras.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington D.C. and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2, 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University and Lynx Edicions, Washington D.C., Michigan, and Barcelona.

Zarri, A.A., Rahmani, A.R., and Senthilmurugan, S. (2004) Ecology of Shola Grassland. Final Report. Part A of Ecology of Shola and Alpine Grassland Project. Bombay Natural History Society, Mumbai, India. Pp. 112.

CAIRNHILL RESERVE FOREST (NILGIRIS)

IN-TN-05

IBA Site Code	: IN-TN-05
Administrative Region	: Tamil Nadu
(State)	
District	: Nilgiris (South Forest Division)
Coordinates	: 11° 23' 38" N, 76° 41' 13"E
Ownership	: State

Area	: 243 ha
Altitude	: 2,200 msl
Rainfall	: 1,200 mm
Temperature	: 11 °C to 18 °C
Biogeographic Zone	: Western Ghats
Habitats	: Montane Wet Temperate Forest, Tropical Secondary Scrub

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats)

PROTECTION STATUS: Not officially protected.

MAP NOT AVAILABLE

GENERAL DESCRIPTION

Cairnhill is located in the Nilgiris district of Tamil Nadu in the Western Ghats. It is a part of the South Range of Nilgiris South Forest Division, located 4–5 km from Ooty town. The site is surrounded by agricultural fields and settlements. It is one of the oldest converted forests in the Upper Nilgiris Plateau. A few small patches of shola still thrive amid the old plantations of *Pinus* sp., *Cyperus* sp., and Wattle *Acacia mearnsii*. Despite its small size, Cairnhill is a promising area for the conservation of Threatened and Western Ghats endemic bird species.

A very small patch of shola forest is left in Cairnhill that supports bird species of conservation interest. Plantations, mainly Wattle, form the principal habitat type in Cairnhill, replacing a significantly higher proportion of the indigenous vegetation. Over a hundred years old, the *Cyperus* plantation stands tall, surrounded on all sides by Wattle, at the top of the hill. Owing to the creation of bare patches in the forest, shrub vegetation characteristic of forest edges now dominates this IBA. *Rhododendron nilagiricum*, endemic to the Nilgiris, is very common. All the grassland in and around this site has disappeared during the 20th century.

AVIFAUNA

Cairnhill provides a home to a number of Western Ghats endemics such as the Black-chinned (Nilgiri) Laughingthrush *Strophocincla cachinnans*, Nilgiri Flycatcher *Eumyias albicaudatus*, Nilgiri Blue Robin *Myiomela major*, Nilgiri Wood-pigeon *Columba elphinstonii*, and Small Sunbird *Nectarinia minima*. Besides, a number of restricted-range and biome related species are recorded from this site. A checklist of bird species recorded in the Upper Nilgiris Plateau is given in Zarri *et al.* (2004).

The species recorded of different biomes are: Tickell's Leaf-warbler *Phylloscopus affinis* (Biome 5: Eurasian

High Montage – Alpine and Tibetan); Indian Blue Robin *Luscinia brunnea* and Large-billed Leaf-warbler *Phylloscopus magnirostris* (Biome 7: Sino-Himalayan Temperate Forest); Square-tailed Black Bulbul *Hypsipetes ganeesa* (Biome 8: Sino-Himalayan Subtropical Forest); White-cheeked Barbet *Megalaima viridis* and Indian

ENDANGERED

Black-chinned (Nilgiri)	<i>Strophocincla cachinnans</i>
Laughingthrush	
Nilgiri Blue Robin	<i>Myiomela major</i>

VULNERABLE

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
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NEAR THREATENED

Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Nilgiri Imperial-pigeon	<i>Ducula cuprea</i>
Grey-fronted Green-pigeon	<i>Treron affinis</i>
Malabar Parakeet	<i>Psittacula columboidea</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Flame-throated Bulbul	<i>Pycnonotus gularis</i>
Nilgiri Blue Robin	<i>Myiomela major</i>
Black-chinned (Nilgiri)	<i>Strophocincla cachinnans</i>
Laughingthrush	
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>
Small Sunbird	<i>Leptocoma minima</i>
Malabar Barbet	<i>Psilopogon malabarica</i>
Nilgiri Thrush	<i>Zoothera neilgherriensis</i>
Nilgiri Flowerpecker	<i>Dicaeum concolor</i>
Malabar Woodshrike	<i>Tephrodornis sylvicola</i>
Malabar Starling	<i>Sturnia blythii</i>

BIOME 10: INDIAN TROPICAL MOIST PENINSULA

White-cheeked Barbet	<i>Megalaima viridis</i>
Indian Scimitar-babbler	<i>Pomatorhinus horsfieldii</i>

Scimitar-babbler *Pomatorhinus horsfieldii* (Biome 10: Indian Peninsula Tropical Moist Forest); Painted Bush-quail *Perdicula erythrorhyncha*, Indian Peafowl *Pavo cristatus*, Common Indian Nightjar *Caprimulgus asiaticus*, Black-rumped Flameback *Dinopium benghalense*, Indian Robin *Saxicoloides fulicata*, Jungle Babbler *Turdoides striatus*, Ashy Prinia *Prinia socialis*, and White-browed Fantail *Rhipidura aureola* (Biome 11: Indo-Malayan Tropical Dry Zone). Many species are seen only in winter.

The site lies in the Western Ghats Endemic Bird Area (EBA 123), where Stattersfield *et al.* (1998) had listed 16 restricted-range species. After recent taxonomic changes (Rasmussen & Anderton 2005, 2012; del Hoyo & Collar 2014), it has been found that 26 bird species are endemic to the Western Ghats. 18 of them are found in this IBA. Many restricted-range species associated with Wet Temperate Sholas and Subtropical Broadleaf Hill Forest (Stattersfield *et al.* 1998) are found here, which proves that some shola habitat is still available, despite extensive plantation in the past. The occurrence of such species also necessitates further protection of the site.

There are not many biome-restricted species. This site is therefore selected on the basis of the presence of globally Threatened and restricted-range species of the Western Ghats (Endemic Bird Area 123).

OTHER KEY FAUNA

Tiger *Panthera tigris* and Leopard *P. pardus* are apparently very rare, probably because of disturbance and lack of continuity with the neighbouring forests. Sambar *Rusa unicolor* and Barking Deer *Muntiacus muntjak* are still common. Troops of Bonnet Macaque *Macaca radiata* and Nilgiri Langur *Trachypithecus johni* can easily be seen. Other mammals include Wild Boar *Sus scrofa*, Golden Jackal *Canis aureus*, Jungle Cat *Felis chaus* and Brown Palm Civet *Paradoxurus jerdoni*.

LAND USE

- Forestry
- Plantation

THREATS AND CONSERVATION ISSUES

- Fuel wood collection
- Unrestricted tourism
- Infestation by alien invasive species
- Extensive use of inorganic pesticides

The site has experienced significant habitat degradation and loss for the past few decades because of mounting anthropogenic pressure from the surrounding cultivated areas. Major threats to the biodiversity values of this site are uncontrolled human interference and illegal woodcutting and lopping. Invasion by alien species such as Scotch Broom *Cytisus scoparius* and *Eupatorium* sp. all around would



DHIRITMAN MUKHERJEE

Tickell's Blue Flycatcher *Cyornis tickelliae* is a widespread resident and also a winter visitor in many parts of India

further degrade the ecology of this site.

Extensive use of inorganic pesticides in tea and vegetable cultivation surrounding this IBA can also affect the long-term survival of the bird species. Removal of undergrowth, tree lopping, and firewood collection is impacting the microhabitats of several species, including the Black-chinned Laughingthrush and the White-bellied Shortwing.

Because of its proximity to Ooty, this IBA site can be used to promote birdwatching-related ecotourism, so long as the avifauna and overall biodiversity is protected.

KEY CONTRIBUTOR

Ashfaq Ahmed Zarri.

KEY REFERENCES

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Vol. 1: Non-passerines. Lynx Edicions, Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington D.C. and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2, 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University and Lynx Edicions, Washington D.C., Michigan, and Barcelona.

Stattersfield, A.J., Crosby, M.J., Long, A.J. and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK. Pp. 846.

Zarri, A.A., Rahmani, A.R., and Senthilmurugan, S. (2004) Ecology of Shola Grassland. Final Report. Part A of Ecology of Shola and Alpine Grassland Project. Bombay Natural History Society, Mumbai, India. Pp. 112.

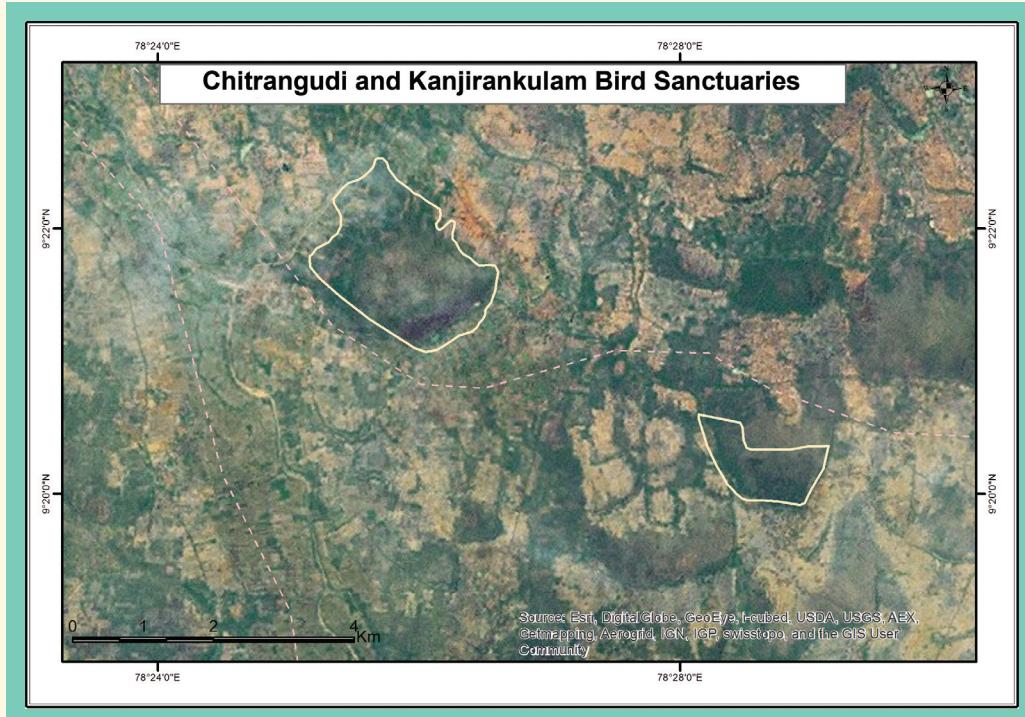
CHITRANGUDI AND KANJIRANKULAM BIRD SANCTUARIES

IBA Site Code	: IN-TN-06
Administrative Region (State)	: Tamil Nadu
District	: Ramanathapuram
Coordinates	: 9° 19' 48" N, 78° 28' 60" E
Ownership	: State

Area	: 152 ha
Altitude	: 15 msl
Rainfall	: 790 mm
Temperature	: 21 °C to 36 °C
Biogeographic Zone	: Deccan Peninsula
Habitats	: Freshwater Reservoir

IBA CRITERIA: A4i ($\geq 1\%$ biogeographic population of congregatory waterbirds)

PROTECTION STATUS: Bird Sanctuaries, established September, 1989.



GENERAL DESCRIPTION

Chitrangudi (48 ha) and Kanjirankulam (104 ha) Bird Sanctuaries are situated in the Ramanathapuram district of Tamil Nadu, in the villages of the same name. The sanctuaries are c. 5 km from Mudukulathur and c. 25 km from Paramakudi, in a drought prone area.

The floral diversity is very poor, and the area is covered with scrub jungle. It has been planted with *Prosopis chilensis* and *Acacia nilotica* in the villages and around the tanks. These two species were introduced and planted by the Forest Department on a massive scale to sustain firewood collection. Tamarind *Tamarindus indica* is the only common tree, growing sporadically on the roads and the tank bunds. Due to the nature of the soil and scanty rainfall, the natural vegetation is very sparse.

AVIFAUNA

The site qualifies as an IBA as the Near Threatened Spot-billed Pelican *Pelecanus philippensis* breeds here. Up to 100 birds reportedly breed here, i.e., 1% of the biogeographic population (Wetlands International 2012). Chitrangudi and Kanjirankulam Bird Sanctuaries are two of the oldest known pelicanries in the state, which the locals have protected since time immemorial. Johnson *et al.* (1993) reported seeing 700 pelicans in January 1989, and 286 in 1991, in the same tank.

Besides the Spot-billed Pelican, the Asian Openbill *Anastomus oscitans*, Little Egret *Egretta garzetta*, Great Egret *Casmerodius albus*, Grey Heron *Ardea cinerea*, Purple Heron *Ardea purpurea*, and Indian Pond-heron *Ardeola grayii* are known to breed in both villages.

In Kanjirankulam, Abraham (1973) found Painted Stork *Mycteria leucocephala* breeding on the same trees

IN-TN-06



ASAD R. RAHMANI

Chitrangudi and Kanjirankulam Bird Sanctuaries are two of the oldest known heronries in Tamil Nadu. Besides the Spot-billed Pelican a large number of Grey Heron *Ardea cinerea*, Purple Heron *Ardea purpurea*, Asian Openbill *Anastomus oscitans*, and egrets breed in this IBA

as pelican nests were found. During his visit, the nesting colony was spread across about 60 trees, mainly *Ficus religiosa*, *Thespesia populnea*, and *Acacia arabica*. He also found nesting colonies of Black-headed Ibis *Threskiornis melanocephalus* and Red-naped (Black) Ibis *Pseudibis papillosa*, c. 1.6 km away from Kanjirankulam.

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>

OTHER KEY FAUNA

Due to the presence of scrub jungle and surrounding agricultural fields, the area does not have large or medium sized mammals.

LAND USE

- Water management
- Agriculture
- Grazing

THREATS AND CONSERVATION ISSUES

- Poaching
- Encroachment

While poaching at the nesting site is not a major problem, many adult birds are killed by tribals for food. Traditional nesting trees are dying due to drought and poor rainfall. The tanks need reconstruction of their bunds to collect and store adequate water during the monsoon, to safeguard the nesting trees of the threatened pelicans. The Forest Department should take remedial measures to protect the trees. Conservation education is needed to restrict the increasing anthropogenic pressure on the avifauna.

KEY CONTRIBUTOR

V. Kannan.

KEY REFERENCES

Abraham, S. (1973) The Kanjirankulam breeding bird sanctuary in the Ramnad district of Tamil Nadu. *JBNHS* 70: 549–552.

Johnson, J.M., Perennou, C., and Crivelli, A. (1993) Towards the extinction of the Spot-billed Pelican (*Pelecanus philippensis*). Pp. 92–94. In: Moser, M. and Van Versem, J. (Eds) *Wetland and Waterfowl Conservation in South and West Asia*. IWRB Spec. Publ. No. 25: AWB Publ. No. 85.

Wetlands International (2012) *Waterbird Population Estimates: Fifth Edition*. Wetlands International Global Series No. 12. Wageningen, The Netherlands. (online edition)

GOVERNOR'S SHOLA

IN-TN-07

IBA Site Code	: IN-TN-07
Administrative Region	: Tamil Nadu
(State)	
District	: Nilgiris (South Forest Division)
Coordinates	: 11° 31' 01" N, 76° 37' 07" E
Ownership	: State

Area	: Not available
Altitude	: 2,200 msl
Rainfall	: 1,200 mm
Temperature	: 11 °C to 18 °C
Biogeographic Zone	: Western Ghats
Habitats	: Montane Wet Temperate Forest, Tropical Secondary Scrub

IBA CRITERIA : A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats)

PROTECTION STATUS : Not officially protected.

MAP NOT AVAILABLE

GENERAL DESCRIPTION

Governor's Shola is located in the northwestern corner of Tamil Nadu. It lies c. 8 km from Ooty town along the Ooty-Porthimunth road, and is part of the Wenlock Downs Range in the Nilgiris South Forest Division. This IBA was known for its excellent natural forest and grassland till the first half of the 20th century. Today, much of what existed in the mid 20th century has been converted into exotic plantations, as in many other sites in the Nilgiris.

This site also experienced significant habitat loss over the years because of anthropogenic pressures from the surrounding villages and conversion of land to agricultural use. The biodiversity values of the site remain under tremendous pressure. Nevertheless, this small forest area still harbours a number of bird species of conservation interest.

Governor's Shola is a medium sized patch of shola amid plantations and cultivation. Species comprising include *Actinodaphne bourdillonii*, *Ilex denticulata*, *Litsea wightiana*, *Michelia nilagirica*, *Microtropis ramiflora*, *Pithecellobium subcoriaceum*, *Symplocos pendula*, *Syzygium arnottianum*, *Eurya nitida*, *Photina notoniana*, *Ternstroemia japonica*, *Berberis tinctoria*, *Heydotis stylosa*, *Leucas suffruticosa*, and *Smithia blanda*. Besides, several genera of Himalayan elements such as *Rhododendron*, *Hypericum*, *Rubus*, *Lonicera*, *Gaultheria*, and *Pittosporum* are also common. The shola forests harbour an amazing floral diversity, with many epiphytic orchids.

AVIFAUNA

Governor Shola holds a bird community with small populations of some globally Threatened and restricted-range species, besides many common birds. A checklist of birds recorded in the area around this site is given by Zarri *et al.* (2004).

Governor's Shola is located in the Western Ghats Endemic Bird Area (EBA 123), where Stattersfield *et al.* (1998) had listed 16 restricted-range species. According to present taxonomy (Rasmussen & Anderton 2005, 2012; del Hoyo & Collar 2014), there are 26 endemic bird species in the Western Ghats. Most of the species associated with Wet Temperate Shola and Sub-tropical Broadleaf Hill Forest are found here.

This site is selected as an IBA based on the presence of globally Threatened and restricted-range species, A1 and A2 criteria respectively of BirdLife International (2014).

OTHER KEY FAUNA

Most of the mammals found in the sholas of the Nilgiris are also found here. Noteworthy species are Nilgiri Langur *Trachypithecus johni*, Tiger *Panthera tigris*, Leopard

ENDANGERED

Black-chinned (Nilgiri) Laughingthrush *Strophocincla cachinnans*
Nilgiri Blue Robin *Myiomela major*

VULNERABLE

Nilgiri Wood-pigeon *Columba elphinstonii*

NEAR THREATENED

Grey-headed Bulbul *Microtarsus priocephalus*

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Nilgiri Imperial-pigeon	<i>Ducula cuprea</i>
Nilgiri Blue Robin	<i>Myiomela major</i>
Black-chinned (Nilgiri) Laughingthrush	<i>Strophocincla cachinnans</i>
White-bellied Blue-flycatcher	<i>Cyornis pallipes</i>
Malabar Barbet	<i>Psilopogon malabarica</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Small Sunbird	<i>Leptocoma minima</i>
Malabar Woodshrike	<i>Tephrodornis sylvicola</i>
Malabar Starling	<i>Sturnia blythii</i>

P. pardus, Wild Dog *Cuon alpinus*, Sambar *Rusa unicolor*, and Barking Deer *Muntiacus muntjak*. Not much research has been done on the reptile and other fauna of this IBA, but it could not be very different from similar extant sholas.

LAND USE

- Forestry
- Plantation

THREATS AND CONSERVATION ISSUES

- Consequences of monoculture plantation and invasive species
- Overgrazing
- Conversion of forests to cultivation
- Extensive use of inorganic pesticides

This shola forest has been subjected to a succession of large-scale monoculture plantations of Wattle *Acacia mearnsii*, Eucalyptus or Blue Gum *Eucalyptus globosus*, and Pine *Pinus patula*. Invasive weeds such as Scotch Broom *Cytisus scoparius* and *Ulex europaea* have now invaded this site, putting further pressure on the natural ecosystem.

Settlements around the site have grown mainly because of immigration of people from the plains encouraged by several development projects. This has resulted in habitat degradation through firewood collection, illegal tree felling and overgrazing.

Depletion of the shola undergrowth has affected the population of important bird species such as the Nilgiri

Blue Robin and Nilgiri Laughingthrush.

There is an urgent need to protect this area with the active involvement of the inhabitants of the surrounding settlements, if long-term conservation of the biodiversity in general, and bird community in particular, is to be ensured.

KEY CONTRIBUTOR

Ashfaq Ahmed Zarri.

KEY REFERENCES

BirdLife International (2014) IUCN Red List for birds. Downloaded from <http://www.birdlife.org>

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Vol. 1: Non-passerines. Lynx Edicions, Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington D.C. and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2, 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University, and Lynx Edicions, Washington D.C., Michigan, and Barcelona.

Stattersfield, A.J., Crosby, M.J., Long, A.J., and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK. Pp. 846.

Zarri, A.A., Rahmani, A.R., and Senthilmurugan, S. (2004) Ecology of Shola Grassland. Final Report. Part A of Ecology of Shola and Alpine Grassland Project. Bombay Natural History Society, Mumbai, India. Pp. 112.

GRASS HILLS

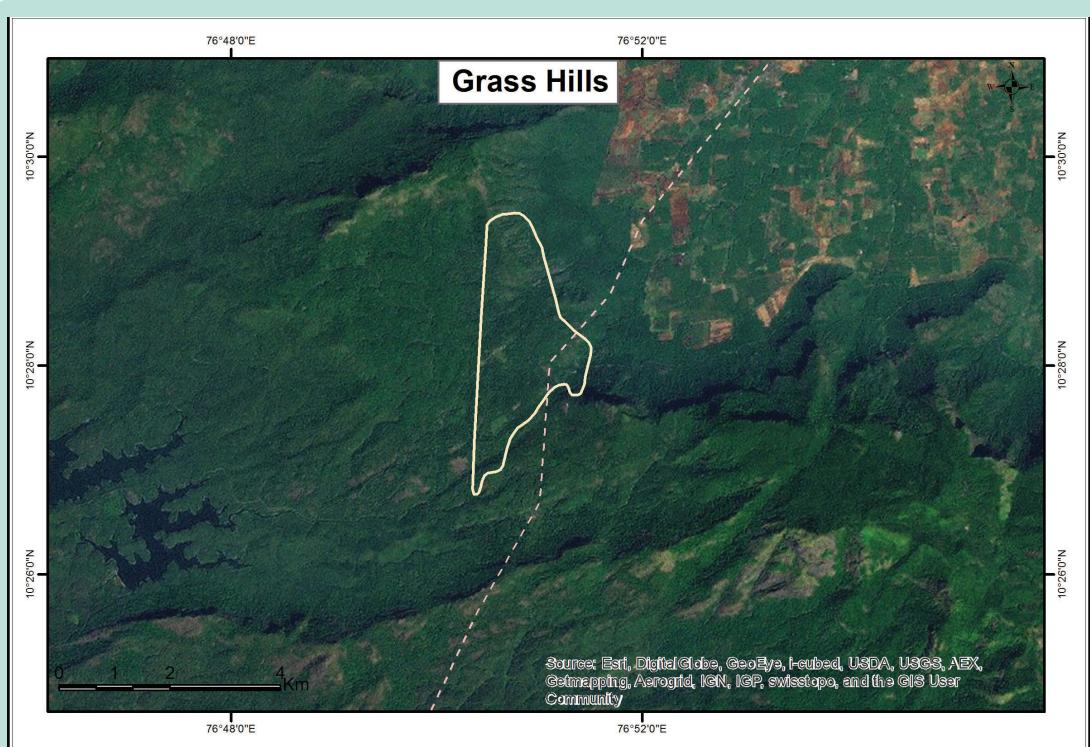
IN-TN-08

IBA Site Code	: IN-TN-08
Administrative Region (State)	: Tamil Nadu
District	: Coimbatore
Coordinates	: 10° 20' 59" N, 77° 3' 35" E
Ownership	: State
Area	: 65,700 ha

Altitude	: 1,800 msl
Rainfall	: 1,500 to 3,000 mm
Temperature	: 5 °C to 35 °C
Biogeographic Zone	: Western Ghats
Habitats	: Evergreen Montane Forest (Shola), Grassland

IBA CRITERIA : A1 (Threatened species), A2 (Endemic Bird Area EBA 123: Western Ghats)
Biome 10 (Indian Peninsula Tropical Moist Forest)

PROTECTION STATUS : Multiple levels of protection: Part of Indira Gandhi Wildlife Sanctuary (notified 1974) and Grass Hills National Park, notified 1989 are included in Anamalai Tiger Reserve. Sanctuary and National Park under consideration by UNESCO as part of the Western Ghats World Heritage Site (UNESCO 2015).



GENERAL DESCRIPTION

The Grass Hills plateau in the southeastern part of Indira Gandhi (Anamalai) Wildlife Sanctuary extends over c. 108 sq. km. Situated at an altitude of 1,800 m, the plateau is continuous with Eravikulam National Park in Kerala on its southern and southeastern sides. On the north and northwest, it is bounded by forest and tea plantations, and on the northeast, west, and southwest sides, by forest. A township with tea estates, Akka Malai, lies on the plateau. Akka Malai can be approached from the townships of Valparai or Iyerpadi through the Peria Karamalai group of estates (Mishra & Johnsingh 1994). The area has several

ridges and peaks with extensive cliffs.

A mosaic of grassland-shola is present all along the crest of the Western Ghats. Besides being the major habitat of the Nilgiri Tahr *Hemitragus hylocrius*, it is used by a diverse array of fauna. Several large mammals, many of them protected under the Indian Wildlife (Protection) Act, 1972, were found to use the grassland areas. Unfortunately, these grasslands, which represent a unique ecosystem, have been traditionally viewed as wastelands by the Forest Department. There have been repeated attempts to convert the grasslands into commercially valuable exotic plantations. In the last 100 years, vast areas of grassland and Evergreen

Montane Forest have been converted into such plantations (Mishra & Johnsingh 1994).

Most of this IBA has extensive short grassland, a little shrub cover, and several perennial sources of water. Only the valleys have tall grasses. Grass species recorded from the area include *Eulalia phaeothrix*, *Themeda quadrivalvis*, *Arundinella purpurea*, *Chrysopogon zeylanicus*, *Heteropogon contortus*, and *Tripogon ananthaswamianus*.

AVIFAUNA

More than 300 species of birds have been identified in the park, including 15 species of birds endemic to the Western Ghats (http://www.forests.tn.nic.in/wildbiodiversity/ws_igws.html. Accessed on March 5, 2015). The sanctuary houses many interesting species of birds, such as Sri Lanka Frogmouth *Batrachostomus moniliger* and Chestnut-winged Cuckoo *Clamator coromandus*. Birds of prey, including Black Eagle *Ictinaetus malayensis*, Crested Goshawk *Accipiter trivirgatus*, Rufous-bellied Eagle *Lophotriorchis kienerii*, Jerdon's Baza *Aviceda jerdoni*, and Mountain Hawk-eagle *Nisaetus nipalensis* are reported here. Other interesting species include Malabar Pied Hornbill *Anthracoboceros coronatus*, Malabar Grey Hornbill *Ocyceros griseus*, White-bellied Great Black Woodpecker *Dryocopus javensis*, Alpine Swift *Tachymarptis melba*, Brown-backed Needletail *Hirundapus giganteus*, Mountain Imperial-pigeon *Ducula badia*, Nilgiri Wood-pigeon *Columba elphinstonii*, Oriental Dollarbird *Eurystomus orientalis*, Malabar Trogon *Harpactes fasciatus*, Asian Fairy Bluebird *Irena puella*, Blue-bearded Bee-eater *Nyctyornis athertoni*, White-bellied Treepie *Dendrocitta leucogastra*, White-bellied Blue Robin *Myiomela albiventris* (earlier known as White-bellied Shortwing *Brachypteryx major*), Wynnaad Laughingthrush *Dryonastes* (earlier *Garrulax delesserti*), Southern Hill-myna *Gracula indica*, and Nilgiri Flycatcher *Eumyias albicaudatus* (http://www.forests.tn.nic.in/wildbiodiversity/ws_igws.html. Accessed on March 5, 2015).

Due to its remoteness, Grass Hills is perhaps one of the finest habitats in the Western Ghats for endemic and restricted-range species. Stattersfield *et al.* (1998) have identified 16 endemic or restricted-range species in the Western Ghats. Recent taxonomic changes (Rasmussen & Anderton 2005, 2012; del Hoyo & Collar 2014) show that 26 endemic birds are found in the Western Ghats. In the Grass Hills and surrounding areas, 21 species are found. Along with Eravikulam National Park, this IBA is the main habitat of the Nilgiri Pipit *Anthus nilghiriensis*. The Nilgiri Wood-pigeon *Columba elphinstonii* and Indian Broad-tailed Grass-warbler or Grassbird *Schoenicola platyurus* are other Vulnerable and restricted-range species found here. Great Pied Hornbill *Buceros bicornis* is a common resident at lower elevations.

There is a lot of taxonomic confusion regarding the laughingthrushes. For example, Grey-breasted Laughingthrush

VULNERABLE

Greater Spotted Eagle (?)	<i>Clanga clanga</i>
Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
White-bellied Blue Robin	<i>Myiomela albiventris</i>
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>

NEAR THREATENED

Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Black-and-Rufous Flycatcher	<i>Ficedula nigrorufa</i>

ENDEMIC BIRD AREA EBA 123: WESTERN GHATS

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Nilgiri Imperial-pigeon	<i>Ducula cuprea</i>
Grey-fronted Green-pigeon	<i>Treron affinis</i>
Malabar Barbet	<i>Psilopogon malabarica</i>
Flame-throated Bulbul	<i>Pycnonotus gularis</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Nilgiri Thrush	<i>Zoothera neilgherriensis</i>
Nilgiri Flowerpecker	<i>Dicaeum concolor</i>
White-bellied Blue Robin	<i>Myiomela albiventris</i>
Wynnaad Laughingthrush	<i>Dryonastes delesserti</i>
Palni Laughingthrush	<i>Strophocincla fairbanki</i> (<i>Garrulax jerdoni</i>)
Indian Rufous Babbler	<i>Turdoides subrufus</i>
Black-and-orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudata</i>
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>
Small Sunbird	<i>Leptocoma minima</i>
Malabar Woodshrike	<i>Tephrodornis sylvicola</i>
Malabar White-headed Starling	<i>Sturnia blythii</i>
White-bellied Treepie	<i>Dendrocitta leucogastra</i>

Garrulax jerdoni fairbanki (Ali & Ripley 1987) has been changed to Kerala Laughingthrush *Trochalopteron fairbanki* (Rasmussen & Anderton 2005, 2012). While Grimmett *et al.* (2012) still call it Kerala Laughingthrush *Garrulax fairbanki*, Nameer & Praveen (2012) have named it Palni Laughingthrush *Strophocincla fairbanki*.

The site lies in Biome 10 (Indian Peninsula Tropical Moist Forest). Considering the extent of intact shola, many biome-restricted species are likely to occur here, especially high altitude forest birds of the Western Ghats.

OTHER KEY FAUNA

Besides the Nilgiri Tahr, Grass Hills is famous for large herds of Gaur *Bos gaurus*. Other fauna include the Tiger *Panthera tigris*, Leopard *P. pardus*, Asiatic Elephant *Elephas maximus*, Sambar *Rusa unicolor*, Barking Deer or Indian Muntjac *Muntiacus muntjak*, Grey Slender Loris *Loris lydekkerianus*, Nilgiri Marten *Martes gwatkinsii*, Smooth-coated Otter *Lutragale perspicillata*, Travancore Flying Squirrel *Petinomys fuscocapillus*, Anaimalai Spiny Lizard *Salea anamallayana*, and Malabar Pit Viper *Trimeresurus malabaricus*.

A total of 315 species of butterflies have been identified till now in the Anamalai Hills, of which 44 are endemic to the Western Ghats. Therefore, Grass Hills is likely to harbour many of these species.



M.D. MADHUSUDAN

Grass Hills plateau (> 100 sq. km), at an altitude of 1,800 m and above, is contiguous with Eravikulam National Park in Kerala.

This is one of the biggest contiguous grassy plateaus in the Western Ghats

LAND USE

- Nature conservation and research

THREATS AND CONSERVATION ISSUES

- Poaching
- Invasive species

The site is well protected with no encroachments, and there are no settlements except a few in adjacent areas. Visitors have to seek permission from the Forest Department, and the site is not open to tourists. However, there is pressure to open this area to tourism in recent times, with various proposals for development of roads and other tourist infrastructure. As the area is understaffed, poaching is rampant. Mishra & Johnsingh (1994) found at least three poachers with muzzle-loading guns during their survey. They also heard shots twice in one week.

The Forest Department made several attempts to establish Black Wattle *Acacia mearnsii* plantations. Pine *Pinus* sp. and *Eucalyptus* plantations can be seen near Konalar Bungalow (Mishra & Johnsingh 1994). Wattle has already taken over the grassland near Konalar and along the fringes of Eravikulam National Park. It is now colonizing the Grass Hills NP area, seriously threatening the Tahr habitat. The Forest Department, along with local research institutions, has uprooted and destroyed wattle from a few

hectares so far, and this has to be done in the remaining areas (NCF & VCT 2006).

The existing Pine and the earliest Eucalyptus plantations are being used to meet fuel wood and other requirements of Konalar Bungalow. This is desirable, since it substitutes for fuel wood extraction from the sholas. Evidence of these two species colonizing further areas was not recorded. The existing plantations should be maintained for fuel wood (Mishra & Johnsingh 1994).

The streams have been stocked with Rainbow Trout *Oncorhynchus wykiss* which has affected the local hillstream fish fauna.

KEY CONTRIBUTORS

Charudutt Mishra, T.R. Shankar Raman, Divya Mudappa, Abi Amen, P. Jeganathan.

KEY REFERENCES

Ali, S. and Ripley, S.D. (1987) *Compact Edition of the Handbook of the Birds of India and Pakistan*. Oxford University Press, New Delhi.

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Vol. 1: Non-passerines. Lynx Edicions, Barcelona.

Grimmett, R., Inskip, C., and Inskip, T. (2012) *Birds of the Indian Subcontinent*. 2nd edn. Oxford University Press, UK.

Mishra, C. and Johnsingh, A.J.T. (1994) Status and conservation of



A.J.T. JOHNSINGH

Nilgiri Tahr is an endemic ungulate of the southern Western Ghats. It is discontinuously distributed in Karnataka, Tamil Nadu, and Kerala

the Nilgiri Tahr (*Hemitragus hylocrius* Ogilby, 1838) in Anamalai Hills, South India. Wildlife Institute of India, Dehradun.

Nameer, P.O. and Praveen, J. (2012) Taxonomy, Distribution and Conservation Status of Strophocincla Laughingthrushes of Western Ghats. Pp. 132–134. In: Rahmani, A.R. *Threatened Birds of India: Their Conservation Requirements*. Indian Bird Conservation Network: Bombay Natural History Society, Royal Society for the Protection of Birds and BirdLife International. Oxford University Press. Pp. xvi + 864.

NCF & VCT (2006) *Principles for Rainforest and Grassland Restoration in the Anamalai Hills*. Nature Conservation Foundation, Mysore and Vattakanal Conservation Trust, Kodaikanal.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington D.C. and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2, 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University, and Lynx Edicions, Washington D.C., Michigan, and Barcelona.

Stattersfield, A.J., Crosby, M.J., Long, A.J., and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK Pp. 846.

UNESCO (2015) World Heritage Sites, Tentative lists, Western Ghats sub cluster, Anamalai, 2007 (Accessed on March 5, 2015. whc.unesco.org

GULF OF MANNAR MARINE NATIONAL PARK

IN-TN-09

IBA Site Code	: IN-TN-09
Administrative Region (State)	: Tamil Nadu
District	: Ramanathapuram, Tuticorin
Coordinates	: 8° 40' 00" N, 78° 10' 00" E
Ownership	: State
Area	: 623 ha (land area)

Altitude	: 0–6 msl
Rainfall	: 900 mm
Temperature	: 25 °C to 31°C
Biogeographic Zone	: Coasts
Habitats	: Littoral Forest, Tropical Secondary Scrub,

IBA CRITERIA: A1 (Threatened species), A4 (iii) ($\geq 20,000$ waterbirds)

PROTECTION STATUS: National Park, established September, 1986.

Declared as Gulf of Mannar Marine Biosphere Reserve, on 18 February 18, 1989.



GENERAL DESCRIPTION

The Gulf of Mannar, the first marine Biosphere Reserve of India, off the southern extremity of the country, includes a group of 21 islands, located 0.2 to 8 km off the coast. Most of the islands are small, from a few hectares to less than 4 sq. km, running roughly parallel to the coast. The islands are mainly of coral origin.

The Gulf of Mannar Marine Biosphere Reserve came into existence on February 18, 1989 by a joint declaration of the Government of India and Tamil Nadu State Government. It has been recognized by the Man and Biosphere Programme of UNESCO. Within the Gulf of Mannar Marine Biosphere Reserve is the Gulf of Mannar Marine National Park that surrounds the chain of 21 islands, which was set up by a G.O. Ms. No. 964 of the Forest and Fisheries Department dated September 10, 1986 (Kumaraguru *et al.* 2006)

The Gulf of Mannar is the first Marine Biosphere Reserve not only in India, but also in South and Southeast Asia. It is c. 60 km from Ramanathapuram. The Gulf of Mannar has a coastal length of c. 141 km. The International Union for Conservation of Nature and Natural Resources (IUCN) Commission on National Parks and the World Wildlife Fund (WWF) identified the reserve as being an area of “particular concern” given its biodiversity and special “multiple use” management status.

Mandapam lies on a narrow peninsula projecting from the southeast coast of India, with the Gulf of Mannar to the south and Palk Bay to the north. At the end of the peninsular extension is Pamban Island, which is connected to the mainland by a railway bridge. The inshore region of the Palk Bay is largely muddy, while in the Gulf of Mannar it is rocky and interspersed with small areas of sand and

mud (Balachandran 1995). The mixing of waters of Palk Bay and the Gulf takes place through the Pamban Pass and also through Adam's Bridge between Dhanushkodi and the west coast of Sri Lanka (Jayaraman 1954).

The Gulf of Mannar Marine National Park covers 6.23 sq. km, but the Biosphere Reserve stretches 180 km along the coast and is c.10 km wide. Forty villages lie within the Biosphere Reserve.

There are four or five main islands and lagoons: Manali Island, Hare Island, Kundugal inter-tidal area, Pallaimadam lagoon, and Dhanushkodi lagoon.

AVIFAUNA

About 187 species of aquatic and terrestrial birds have been identified from this IBA site (Balachandran 1990, 1995), which is famous for waders and seabirds. Sometimes >50,000 waterbirds are found here. Pelagic birds are also recorded (Balachandran 1990). Its proximity to Sri Lanka makes this IBA an important flyway for migratory birds. Among the waders, the Lesser Sand Plover *Charadrius mongolus*, Curlew Sandpiper *Calidris ferruginea*, and Little Stint *C. minuta* are the most abundant. Red Knot *C. canutus* is a regular winter visitor in small numbers, and the species is not a vagrant as reported previously. The rare Great Knot *C. tenuirostris* has also been recorded from this area. The occurrence of Crab Plover *Dromas ardeola* in hundreds indicates that the two islands (Manali and Hare) in the Gulf of Mannar are important habitats for the species, next only to Pirotan Island in Kutch (coastal northwest India, another IBA) (where two to three thousand individuals were reported to winter regularly).

The Bar-tailed Godwit *Limosa lapponica*, reportedly a straggler in south India, has been recorded in hundreds. The status of Sanderling *Calidris alba* was confirmed as a regular common winter migrant, after being first recorded by Biddulph (1938) earlier.

BNHS has done studies in the Mandapam area of the Gulf of Mannar. Marine terns such as the Lesser Crested *Sterna bengalensis* and Sandwich *S. sandvicensis* commonly occur, and the former was found breeding. The other breeding species at Mandapam are: Little Tern *Sterna albifrons*, Kentish Plover *Charadrius alexandrinus*, Great Stone-Plover *Esacus magnirostris*, and Stone Curlew *Burhinus oedicnemus*. Since Greater Flamingos *Phoenicopterus roseus* frequent this area in several thousands, this IBA ranks third as an important wintering ground for flamingos along the east coast, after

Pulicat Lake (IBA) and Great Vedaranyam Swamp. Rare waders in this area are the Broad-billed Sandpiper *Limicola falcinellus*, Dunlin *Calidris alpina*, Long-toed Stint *C. subminuta* and Red-necked Phalarope *Phalaropus lobatus*.

The Gulf of Mannar lies within the passage of many migrants such as Black-tailed Godwit *Limosa limosa* and Broad-billed Sandpiper *Calidris falcinellus*. Also, 15 species of migratory waders and eight species of migratory terns were found to summer here, especially on the two islands.

Along with Chilika Lake in Orissa (an IBA) and Point Calimere in Tamil Nadu (another IBA), the Gulf of Mannar forms an extremely important link for migrant and resident waders. On the Sri Lanka side, about 10 km away, in Jaffna district, there are four IBAs: Anatidal-Thondamannar, Araly South-Punale, Kaithady, and Kayts Island-Mandativu (Anon. 2003).

OTHER KEY FAUNA

This IBA is very important for the Dugong *Dugong dugon*, one of the Vulnerable species of marine mammals on the east coast of India. Several species of cetaceans also occur in the Park. Marine turtles breed in small numbers, and there is a rich marine fauna associated with the reefs and seagrass. Green Tiger Prawn *Penaeus semisulcatus* is extensively harvested for export.

The Gulf of Mannar National Park has 3,600 species of plants and animals. Gulf of Mannar and Palk Bay contain some of the most extensive beds of seagrasses (Hydrocharitaceae and Potamogetonaceae) on the east coast of India. Six of the world's 12 seagrass genera and 13 of the world's 50 species occur in the Gulf. Krusadai Island exemplifies the biological significance of this area. The island harbours three species of seagrass endemic to the Gulf of Mannar, and also a unique protochordate *Ptychoderma fluva*, a taxonomically unique living fossil which links vertebrates with invertebrates. The seagrass beds are extremely important for the Dugong. They also provide food and habitat to five species of marine turtles: Green *Chelonia mydas*, Olive Ridley *Lepidochelys olivacea*, Hawksbill *Eretmochelys imbricata*, Leathery *Dermochelys coriacea*, and Loggerhead *Caretta caretta*.

This IBA has a huge human population which largely depends, directly or indirectly, on the seagrass meadows. A range of artisanal fishermen and shell collectors either extract their resources directly from the seagrass meadows or depend on the linkages between seagrasses and other ecosystems for derived benefits (Moses *et al.* 2008).

The diverse nature of ecosystems in the Gulf of Mannar supports a wide variety of significant species including 117 species of corals, 641 species of crustaceans, 731 species of molluscs, 441 species of finfishes, and 147 species of seaweeds, apart from the seasonally migrating marine mammals like whales, dolphins, porpoises, and turtles (Kumaraguru *et al.* 2006).

VULNERABLE

Great Knot *Calidris tenuirostris*

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Eurasian Curlew	<i>Numenius arquata</i>
Black-tailed Godwit	<i>Limosa limosa</i>



The Gulf of Mannar between India and Sri Lanka is an important flyway route for migratory birds, particularly waterbirds

Marimuthu *et al.* (2010) mentioned the occurrence of 48 species of scleractinian corals in the Manoli Reef Complex and Krusadai Reef Complex in the Gulf of Mannar.

About 120 species of coral have been identified from the Gulf of Mannar National Park. Mangroves are also very common. 17 species have been identified so far, including *Pemphis acidula*, which is endemic to the Gulf of Mannar.

LAND USE

- Nature conservation and research
- Fisheries

THREATS AND CONSERVATION ISSUES

- Tourism
- Illegal trade in sea animals
- Fishing
- Development projects

Indiscriminate destruction of the marine fauna and flora continues, despite the preventive efforts of the Fisheries Department. The population of sea turtles and dugong is declining as a result of direct persecution and destruction of seagrass beds. The invasive alien species *Prosopis chilensis* has become dominant on some of the islands nearer the coast at the expense of native vegetation, and there have been proposals to plant other exotic tree species on some of the islands. The quarrying of coral for industrial use has now been banned, but several areas of the reef have already been destroyed.

An assessment of the Environmental Economics of the birds and dugong habitats of Marine National Park has been done by BNHS (Daniel *et al.* 2007).

The greatest long-term danger to the Gulf of Mannar Marine National Park is from the proposed multi-million dollar Sethusamudram Project initiated by the Ministry of Surface Transport. The project involves deepening of the Pamban channel to facilitate movement of coastal ships up to

3,000 tonnes. BNHS and others have opposed this project as it would destroy the rich marine biodiversity of this biosphere reserve. The Sri Lankan government has communicated its opposition to the project on the same grounds.

KEY CONTRIBUTORS

S. Balachandran, V. Kannan.

KEY REFERENCES

Anony. (2003) *Important Bird Areas of Sri Lanka: Preliminary IBA Site Directory*. Field Ornithology Group of Sri Lanka. Pp. 130.

Balachandran, S. (1990) Interesting bird records from Mandapam and its neighbouring islands. *JBNHS* 87: 456–457.

Balachandran, S. (1995) Shore birds of the Marine National Park in the Gulf of Mannar, Tamil Nadu. *JBNHS* 92: 303–311.

Biddulph, C.H. (1938) The birds of Rameswaram Island. *JBNHS* 40: 238–256.

Daniel, J.C., Balachandran, S., and Arvind, A. (2007) An assessment of the Environmental Economics of the Birds and Dugong habitats of Marine National Park – Gulf of Mannar: Final Report (2005–2007). Bombay Natural History Society, Mumbai.

Jayaram, R. (1954) Seasonal variations in salinity, dissolved oxygen and nutrient salts in the inshore waters of the Gulf of Mannar and Palk Bay near Mandapam (S. India). *Indian J. Fisheries* 1: 345–364.

Kumaraguru, A.K., Joseph, V.E., Marimuthu, N., and Wilson, J.J. (2006) Scientific information on Gulf of Mannar - A Bibliography. Centre for Marine and Coastal Studies, Madurai Kamaraj University, Madurai, Tamilnadu, India. Pp. 656.

Marimuthu, N., Wilson, J.J., and Kumaraguru, A.K. (2010) Reef status in the Mandapam group of Islands, Gulf of Mannar. *Galaxea, Journal of Coral Reef Studies* 12: 65–75.

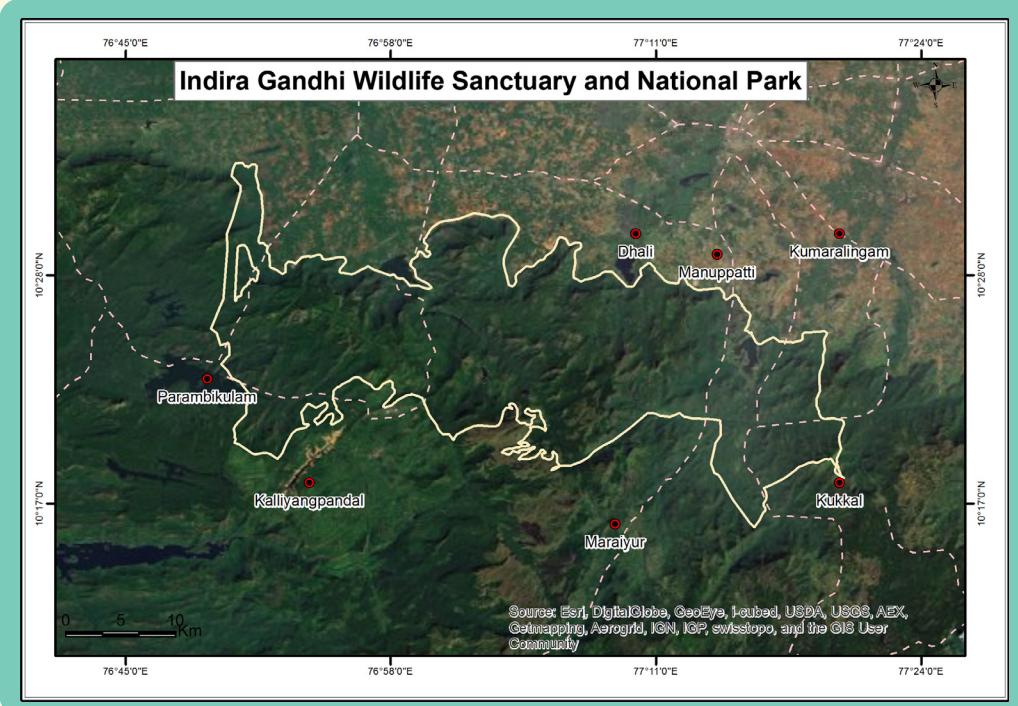
Moses, K.S., Sen, S., Alcoverro, T.M., and Arthur, R. (2008) Seagrass meadows in the Gulf of Mannar: Protecting an Endangered Ecosystem. In: Arthur, R., Babu, Y., Lobo, A.S., Iyer, V., Moses, K.S., Santhakrishnan, M., Sen, S., and Alcoverro, T.M. (Eds) *Scraping the Bottom: Monitoring Human Impacts on Benthic Ecosystems of Tamil Nadu*. UNDP/UNTR and NCF, Chennai. Pp. 218.

INDIRA GANDHI WILDLIFE SANCTUARY AND NATIONAL PARK

IBA Site Code	: IN-TN-10	Rainfall	: 500–5,000 mm
Administrative Region (State)	: Tamil Nadu	Temperature	: 17 °C to 36 °C
District	: Coimbatore	Biogeographic Zone	: Western Ghats
Coordinates	: 10° 25' 11" N, 76° 58' 11" E	Habitats	: Tropical Dry Evergreen Forest, Tropical Moist Scrub, Tropical Grassland, Tropical Secondary Scrub
Ownership	: State		
Area	: 98,700 ha		
Altitude	: 340–2,513 msl		

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats), A3 (Biome 10: Indian Peninsula Tropical Moist Forest)

PROTECTION STATUS: Notified as Anamalai Wildlife Sanctuary, October, 1976. National Park, established 1989. Anamalai Tiger Reserve, notified November, 2010. Park and Sanctuary under consideration by UNESCO as part of the Western Ghats World Heritage Site (UNESCO 2015).



GENERAL DESCRIPTION

Indira Gandhi Wildlife Sanctuary, originally Anamalai Wildlife Sanctuary, is spread over an area of 98,700 ha. On its western side lies the Parambikulam Wildlife Sanctuary (an IBA) of Kerala, which covers 28,500 ha. The interstate boundary between Tamil Nadu and Kerala separates the two protected areas administratively, but ecologically there is no barrier. The terrain is largely hilly with altitude varying from 350 to 2,500 msl.

The Anamalai Hills cover an area of c. 200,000 ha in the Western Ghats. Between the Anamalai Hills to the south and the Nilgiri Plateau to the north, is a 25 km wide stretch of flat land called the Palghat Gap, which has been

an important biogeographic barrier for certain birds and other taxa. This isolation from the northern ranges has resulted in speciation in many plant and animal groups in the Anamalai Hills (Rodgers & Panwar 1988). The altitudinal range (<150 m to >2,500 m) has led to a variety of habitats. Due to these factors, the Anamalai Hills have assumed special conservation importance. Protected areas cover three quarters of the total area of Anamalai Hills, of which Anamalai and Parambikulam Indira Gandhi WLS form more than 80%.

The natural vegetation can be divided into four broad categories: i. Tropical Evergreen Rainforest; ii. Tropical Montane Forest; iii. Grassland; iv. Moist Dry Deciduous

Forest –Important plant species include *Michelia nilagirica*, *Rhododendron arboreum*, *Cymbopogon* sp., *Terminalia-Anogeissus-Tectona grandis* series, with pure stands of *Bambusa arundinacea* and *Dendrocalamus strictus*; v. Monocultures, including plantations of Tea *Thea sinensis*, Coffee *Coffea arabica*, Cardamom, *Eucalyptus* sp., *Cinchona cinchona*, and Teak *Tectona grandis*, which surround this IBA.

AVIFAUNA

From 1991 to 1993, in a bird survey in Indira Gandhi Wildlife Sanctuary and National Park, a total of 218 bird species were recorded. Of these, 12 were endemic and 75 were typical rainforest species (Kannan 1998, Raman 2001). In a recent study that was confined to two ranges, Ulandy and Pollachi, 139 species were recorded of which 10 are restricted-range and two are Vulnerable (Sivakumaran & Rahmani 2002).

The Vulnerable Nilgiri Wood-pigeon *Columba elphinstonii*, and Near Threatened Great Pied Hornbill *Buceros bicornis* are breeding residents in the sanctuary, mainly in Kariyan Shola, Anaikunthy Shola, Varagalaiyar, and Vanathiar Shola of Ulandy Range, and in other ranges such as Valparai and Manjam Patty. Sri Lanka Frogmouth *Batrachostomus moniliger*, an uncommon species, breeds in Kariyan Shola, and probably in other sholas also (Sivakumaran & Rahmani 2002).

Anamalai Hills region (Anamalai-Parambikulam-Vazhachal) is identified as one of the five important conservation landscapes for hornbills, based on their distribution in the Western Ghats (Raman & Mudappa 2003, Mudappa & Raman 2009).

Stattersfield *et al.* (1998) listed 16 restricted-range species in the Western Ghats Endemic Bird Area (EBA 123). In this IBA site, 15 have been recorded till now (Raman 2001, Sivakumaran & Rahmani 2002). Recent taxonomic changes (Rasmussen & Anderton 2005, 2012; del Hoyo & Collar 2014) show that 26 endemic birds are found in the Western Ghats. Most of these endemic birds are found in this IBA.

Except for the Nilgiri Laughingthrush *Garrulax cachinnans*, which is in any case not found south of the Palghat Gap (Ali & Ripley 1987, Grimmett *et al.* 1998), all the endemic birds of the Western Ghats were seen. This is one of the IBAs in the Western Ghats where every expected endemic has been found.

This IBA lies in Biome 10 (Indian Peninsula Tropical Moist Forest), according to the classification by BirdLife International (undated). Fifteen species have been listed in this biome, of which 10 are found at this site.

OTHER KEY FAUNA

Indira Gandhi WLS and National Park, Parambikulam WLS, and Eravikulam National Park (the last two in

ENDANGERED

White-bellied Blue Robin *Myiomela albiventris*

VULNERABLE

Nilgiri Wood-pigeon *Columba elphinstonii*

Nilgiri Pipit *Anthus nilghiriensis*

Indian Broad-tailed Grass-warbler *Schoenicola platyurus*

NEAR THREATENED

Oriental Darter *Anhinga melanogaster*

Pallid Harrier *Circus macrourus*

Great Pied Hornbill *Buceros bicornis*

Malabar Pied Hornbill *Anthracoceros coronatus*

Grey-headed Bulbul *Microtarsus priocephalus*

Black-and-Orange Flycatcher *Ficedula nigrorufa*

Nilgiri Flycatcher *Eumyias albicaudatus*

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon *Columba elphinstonii*

Nilgiri Imperial-pigeon *Ducula cuprea*

Grey-fronted Green-pigeon *Treron affinis*

Malabar Parakeet *Psittacula columbooides*

Malabar Grey Hornbill *Ocyeros griseus*

Malabar Barbet *Psilopogon (Megalaima) malabarica*

Flame-throated Bulbul *Pycnonotus gularis*

Nilgiri Pipit *Anthus nilghiriensis*

Nilgiri Thrush *Zoothera neilgherriensis*

Nilgiri Flowerpecker *Dicaeum concolor*

White-bellied Blue Robin *Myiomela albiventris*

Wynaad Laughingthrush *Dryonastes delesserti*

Palni Laughingthrush *Strophocincla fairbanki*

(Grey-breasted Laughingthrush) *(Garrulax jerdoni)*

Indian Rufous Babbler *Turdoides subrufus*

Black-and-Orange Flycatcher *Ficedula nigrorufa*

Nilgiri Flycatcher *Eumyias albicaudatus*

White-bellied Blue-flycatcher *Cyornis pallipes*

Small Sunbird *Leptocoma minima*

Malabar Woodshrike *Tephrodornis sylvicola*

Malabar Starling *Sturnia blythii*

White-bellied Treepie *Dendrocitta leucogastra*

BIOME 10: INDIAN PENINSULA TROPICAL MOIST FOREST

Blue-faced Malkoha *Phaenicophaeus viridirostris*

Sri Lanka Frogmouth *Batrachostomus moniliger*

Indian Swiftlet *Collocalia unicolor*

Malabar Tropic *Harpactes fasciatus*

White-cheeked Barbet *Megalaima viridis*

Malabar Barbet *Megalaima malabarica*

Yellow-browed Bulbul *Acritillas indica*

Malabar Whistling-thrush *Myophonus horsfieldii*

Indian Scimitar-babbler *Pomatorhinus horsfieldii*

Loten's Sunbird *Cinnyris lotenius*

Kerala), in conjunction with the adjacent forests, form a vital conservation unit for many threatened large mammals, including the Asiatic Elephant *Elephas maximus* and the Nilgiri Tahr *Hemitragus hylocrius* (Rodgers & Panwar 1988). Mishra & Johnsingh (1994) estimate between 560 and 680

Tahrs in Anamalai and Parambikulam Sanctuaries, and between 1,360 and 1,480 if Eravikulam is also included – this conservation unit contains approximately half of the existing population of Nilgiri Tahr in the wild. Tiger *Panthera tigris*, Leopard *P. pardus*, and Dhole or Indian Wild Dog *Cuon alpinus* are the major predators of Tahr in the area. This site has a viable population of Gaur *Bos gaurus*. Mammals endemic to the Western Ghats, besides the Nilgiri Tahr, include the Lion-tailed Macaque *Macaca silenus*, Nilgiri Langur *Trachypithecus johni*, Dusky-striped Squirrel *Funambulus sublineatus*, Nilgiri Marten *Martes gwatkinsii*, Brown Palm Civet *Paradoxurus jerdoni*, and the Travancore Flying Squirrel *Petinomys fuscocapillus* (Prater 1980, Ashraf *et al.* 1993, Mudappa *et al.* 2007).

Recently, Purple Frog *Nasikabatrachus sahyadrensis*, a new Endangered species of frog was discovered in Anamalai Hills (Biju & Bossuyt 2003). With its closest relatives in the Seychelles, the Purple Frog is thought to have evolved separately for millennia. The discovery was hailed as “once in a century” by National Geographic (http://news.nationalgeographic.com/news/2003/10/1015_031015_purplefrog.html). Accessed on March 6, 2015). Its discovery also adds to the evidence that Madagascar and the Seychelles separated from the Indian landmass well after the breakup of Gondwana had started. Described to science as late as 2003, the species is now known to be quite widely distributed in the Western Ghats. This frog stays underground for most of the year and is known to surface only for a few weeks early in the monsoon. Recently, Thomas *et al.* (2014) described the vocal behavior and Zachariah *et al.* (2012) studied the reproduction biology of this fossorial amphibian species.

Another amphibian, the Kerala Indian Frog *Indiranaphrrynoderma*, listed as Critically Endangered, is found at elevations of c. 500 msl in the Anamalai Hills of Kerala and Tamil Nadu (http://www.kerenvis.nic.in/Database/CriticallyEndangeredAnimal_1094.aspx). Accessed on 6 March 2015). Both these frog species are endemic to the Western Ghats and threatened with habitat loss due to subsistence wood collection.

LAND USE

- Nature conservation and research
- Forestry
- Tourism
- Agriculture

THREATS AND CONSERVATION ISSUES

- Encroachments in the foothills
- Poaching
- Excessive tourism
- Tree cutting

The Anamalai Hills were opened to planters in 1864 when the British Government decided to auction some of the

rainforest areas, termed as ‘waste’ in official records, for tea and coffee plantations. Thus began the establishment of the British in the Anamalai, and a century of deforestation and habitat conversion. Vast areas were cleared for coffee, tea, and teak plantations (Kumar 1987). Most of the remaining forests were also selectively logged. These plantations also caused large-scale resettlement of a huge workforce (Kumar 1987). The area abounded in wildlife and attracted hunters, although notes of hunters and planter-naturalists from the early 20th century indicate that hunting was not on a major scale. At present, tea estates occupy c. 18,000 ha and *Cinchona* plantations 4,000 ha within Anamalai WLS (Sundararaju 1987).

The Anamalai is home to nearly 5,000 tribals of six groups: Malasar, Malai Malasar, Kadar, Muduvar, Ervallar, and Pulayar (Chandi 2008). They grow traditional crops, without the use of chemicals. It is possible that due to the onslaught of civilization, some of these crop varieties are becoming extinct, particularly in the plains. There is urgent need to document the traditional knowledge and wisdom of these tribals.

Human pressure, primarily from agriculture, has reduced forest coverage there to less than 10 percent of its original extent. What does remain is remote and inaccessible.

KEY CONTRIBUTORS

Sajeev Kumar, Ajith Kumar, N. Sivakumaran, P. Jeganathan.

KEY REFERENCES

- Ali, S. and Ripley, S.D. (1987) *Compact Edition of the Handbook of the Birds of India and Pakistan*. Oxford University Press, New Delhi.
- Ashraf, N.V.K., Kumar, A., and Johnsingh, A.J.T. (1993) On the relative abundance of two sympatric flying squirrels of Western Ghats, India. *JBNHS* 90: 158–162.
- Biju, S.D. and Bossuyt, F. (2003) New frog family from India reveals an ancient biogeographical link with the Seychelles. *Nature* 425: 711–714.
- BirdLife International (undated) *Important Bird Areas (IBAs) in Asia: Project Briefing Book*. BirdLife International, Cambridge, UK. Unpubl.
- Chandi, M. (2008) Tribes of the Anamalais: livelihood and resource-use patterns of communities in the rainforests of the Indira Gandhi Wildlife Sanctuary and Valparai plateau. NCF Technical Report No. 16, Nature Conservation Foundation, Mysore.
- del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Volume 1: Non-passerines. Lynx Edicions, Barcelona.
- Grimmett, R., Inskip, C., and Inskip, T. (1998) *Birds of the Indian Subcontinent*. Christopher Helm Publishers, London.
- Kannan, R. (1998) Avifauna of the Anamalai Hills (Western Ghats) of south India. *JBNHS* 95(2): 193–214.
- Kumar, A. (1987) The ecology and population dynamics of the lion-tailed macaque (*Macaca silenus*) in south India. Ph.D. Dissertation. University of Cambridge, UK.



Anamalai or Indira Gandhi Wildlife Sanctuary is one of the finest protected areas of Tamil Nadu. It adjoins Parambikulam Wildlife Sanctuary (an IBA) of Kerala and together they form 1,272 sq. km protected area

Mishra, C. and Johnsingh, A.J.T. (1994) Status and Conservation of the Nilgiri Tahr (*Hemitragus hylocrius* Ogilby, 1838) in Anamalai Hills, South India. Unpublished report. Wildlife Institute of India, Dehradun. Pp. 27.

Mudappa, D. and Raman, T.R.S. (2009) A conservation status survey of hornbills (Bucerotidae) in the Western Ghats, India. *Indian BIRDS* 5(4): 90–102.

Mudappa, D., Noon, B.R., Kumar, A., and Chellam, R. (2007) Responses of small carnivores to rainforest fragmentation in the southern Western Ghats, India. *Small Carnivore Conservation* 36: 18–26.

Prater, S.H. (1980) *The Book of Indian Animals*. Bombay Natural History Society, Bombay. Pp. 324.

Raman, T.R.S. (2001) Community ecology and conservation of tropical rainforest birds in the southern Western Ghats, India. Ph.D. Thesis. Centre for Ecological Sciences, Indian Institute of Science, Bangalore. Pp. 182.

Raman, T.R.S. and Mudappa, D. (2003) Correlates of hornbill distribution and abundance in rainforest fragments in the southern Western Ghats, India. *Bird Conservation International* 13: 199–212.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington D.C. and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2, 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University, and Lynx Edicions, Washington D.C., Michigan, & Barcelona.

Rodgers, W.A. and Panwar, H.S. (1988) *Planning a Protected Area Network in India*. 2 vols. Wildlife Institute of India, Dehradun.

Sivakumaran, N. and Rahmani, A.R. (2002) Bird community study in various habitats of Western Ghats. Annual Report. Bombay Natural History Society, Bombay.

Stattersfield, A.J., Crosby, M.J., Long, A.J., and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK. Pp. 846.

Sundararaju, R. (1987) Management plan for Indira Gandhi Wildlife Sanctuary, Pollachi: 1987–88 to 1992–93. Tamil Nadu Forest Department.

Thomas, A., Suyesh, R., Biju, S.D., and Bee, M.A. (2014) Vocal behavior of the elusive Purple Frog of India (*Nasikabatrachus sahyadrensis*), a fossorial species endemic to the Western Ghats. *PLoS ONE* 9(2): e84809. doi:10.1371/journal.pone.0084809

Zachariah, A., Abraham, R.K., Das, S., Jayan, K.C., and Altig, R. (2012) A detailed account of the reproductive strategy and developmental stages of *Nasikabatrachus sahyadrensis* (Anura: Nasikabatrachidae), the only extant member of an archaic frog lineage. *Zootaxa* 3510: 53–64.

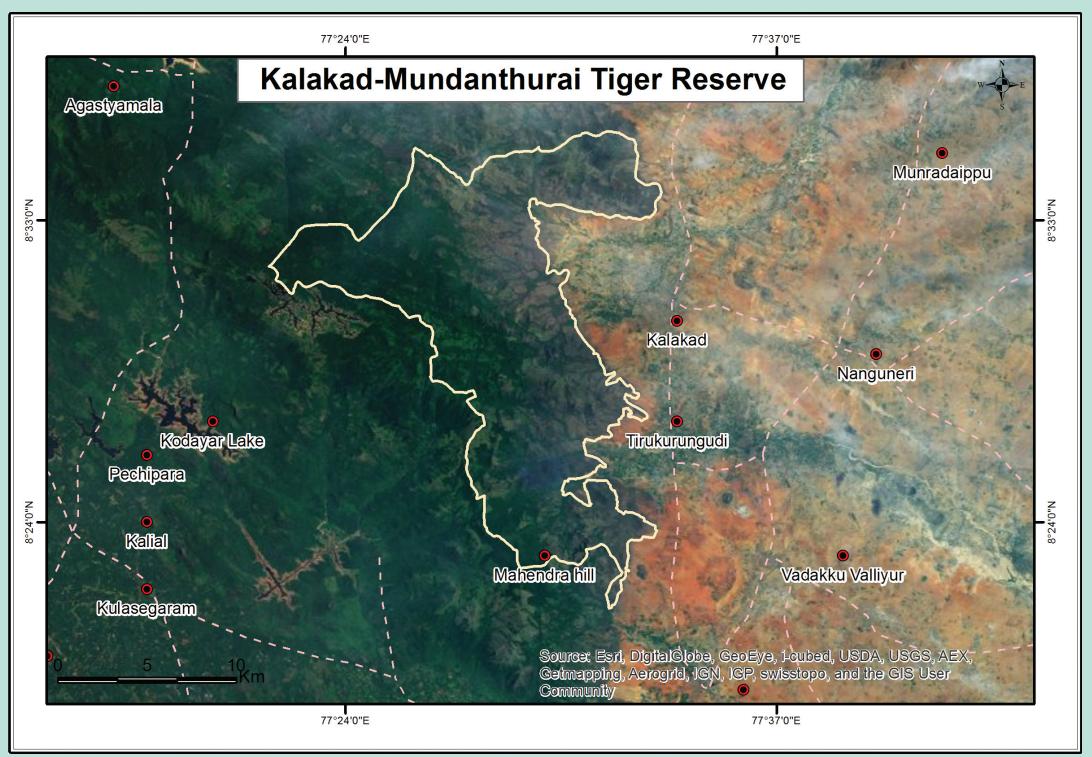
KALAKAD-MUNDANTHURAI TIGER RESERVE

IBA Site Code	: IN-TN-11 (IN-TN-34 Muthukuzhi merged with this IBA)
State	: Tamil Nadu
District	: Tirunelveli
Coordinates	: 8° 25' 56" N, 77° 30' 01" E
Ownership	: State
Area	: 89,500 ha

Altitude	: 0–1,866 msl
Rainfall	: 750 mm to >3,500 mm
Temperature	: 9 °C to 40 °C
Biogeographic Zone	: Western Ghats
Habitats	: Tropical Wet Evergreen and Tropical Semi-evergreen Forest, Tropical Grassland, Scrub Riverine

IBA CRITERIA : A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats)

PROTECTION STATUS : Tiger Reserve, established 1988–1989.



GENERAL DESCRIPTION

Kalakad-Mundanthurai Tiger Reserve (KMTR), created in 1988–1989, is situated at the southern end of the Western Ghats, in the Ashambu Hills of Agasthyamalai region in Tamil Nadu. The boundaries of the reserve are surrounded on all sides by villages. Agasthyamalai (1,681 m), which lies within the core zone of KMTR, is the third highest peak in southern India. A section of the hills in the core of the reserve is considered one of the five major centres of plant diversity and endemism in India.

This IBA site receives rain for eight months in a year. The forests of the reserve form the catchment area of 14 rivers and streams, which constitute its irrigation network

and provide drinking water for the people of Tirunelveli, Tuticorin, and part of Kanyakumari district. Seven major dams, Karayar, Lower Dam, Servalar, Manimuthar, Ramanadi, Kadnanadi, and Kodaiyar have been built on these rivers. Kalakad-Mundanthurai comprises 66,500 ha reserve forest. Because of the occurrence of numerous streams and rivers, the reserve is called a River Sanctuary (Johnsingh 2001). The reserve is the southernmost home of some charismatic and Endangered mammals such as the Nilgiri Tahr *Hemitragus hylocrius* and the Tiger *Panthera tigris*.

KMTR, which sprawls across diverse terrain, is ecologically rich. It has vegetation types ranging from Thorn Scrub to

Montane Wet Evergreen Forests, all within an altitudinal range from sea level to 1,866 msl (Johnsingh 2001).

AVIFAUNA

Kalakad-Mundanthurai is one of the most important sites for Western Ghats endemics, due to good forest cover in most parts of the reserve. Joshua & Johnsingh (1988) found that nearly 160 birds, representing 93 genera and 40 families, have been listed. Of these, 77 are residents, 41 winter visitors, 30 altitudinal migrants, and two summer visitors. But now, according to Forest Department figures, the species number is 273.

CRITICALLY ENDANGERED

Red-headed Vulture *Aegypius calvus*

ENDANGERED

Egyptian Vulture *Neophron percnopterus*
White-bellied Blue Robin *Myiomela albiventris*

VULNERABLE

Nilgiri Wood-pigeon *Columba elphinstonii*
Indian Broad-tailed Grass-warbler *Schoenicola platyurus*
Nilgiri Pipit *Anthus nilghiriensis*

NEAR THREATENED

Spot-billed Pelican *Pelecanus philippensis*
Oriental Darter *Anhinga melanogaster*
Painted Stork *Mycteria leucocephala*
Black-headed Ibis *Threskiornis melanocephalus*
Grey-headed Fish-eagle *Ichthyophaga ichthyaetus*
Pallid Harrier *Circus macrourus*
Laggar Falcon *Falco jugger*
River Tern *Sterna aurantia*
Great Pied Hornbill *Buceros bicornis*
Grey-headed Bulbul *Microtarsus priocephalus*
Nilgiri Flycatcher *Eumyias albicaudatus*

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon *Columba elphinstonii*
Nilgiri Imperial-pigeon *Ducula cuprea*
Grey-fronted Green-pigeon *Treron affinis*
Malabar Parakeet *Psittacula columboidea*
Malabar Grey Hornbill *Ocypterus griseus*
Malabar Barbet *Psilopogon (Megalaima) malabarica*
Nilgiri Pipit *Anthus nilghiriensis*
White-bellied Blue Robin *Myiomela albiventris*
Wynaad Laughingthrush *Dryonastes delesserti*
Indian Rufous Babbler *Turdoides subrufus*
Flame-throated Bulbul *Pycnonotus gularis*
Nilgiri Thrush *Zoothera neilgheriensis*
Indian Broad-tailed Grass-warbler *Schoenicola platyurus*
Black-and-Orange Flycatcher *Ficedula nigrorufa*
Nilgiri Flycatcher *Eumyias albicaudatus*
Nilgiri Flowerpecker *Dicaeum concolor*
White-bellied Blue Flycatcher *Cyornis pallipes*
Small Sunbird *Leptocoma minima*
Malabar Woodshrike *Tephrodornis sylvicola*
Malabar Starling *Sturnia blythii*
White-bellied Treepie *Dendrocitta leucogastra*

The globally Threatened White-bellied Blue Robin *Myiomela albiventris* is found in high elevation rainforests, particularly in Neterikal area. This is an Endangered species endemic to the Western Ghats that have shola forests above 1,500 msl, south of the Palghat Gap (Rahmani 2012). The Oriental Bay Owl *Phodilus badius*, an uncommon species, has been recorded from Sengaltheri (Shankar Raman 2001). Upper Kodayar and Muthukuzhi area could support a good population of Broad-tailed Grass-warbler or Grassbird *Schoenicola platyura*.

The site lies in the Western Ghats Endemic Bird Area (EBA 123), where Stattersfield *et al.* (1998) listed 16 restricted-range species. Based on recent taxonomic splits (Rasmussen & Anderton 2012; del Hoyo & Collar 2014), 26 species of birds are now endemic to the Western Ghats. Except for the Nilgiri Laughingthrush *Garrulax cachinnans* (now termed Black-chinned Laughingthrush *Tracholopteron cachinnans*) which is confined to the Nilgiris, and Vigor's Sunbird *Aethopyga vigorsii* that is found Goa northwards, and a few other species, almost all the remaining restricted-range species of EBA 123 are found here. This is one of the few sites in the Western Ghats where so many restricted-range species are found. This also reflects the diversity and quality of habitats available in KMTR.

Earlier, Red-headed Vulture *Aegypius calvus* was reported, but according to T. Ganesh (*pers. comm.* 2014) there has been no sighting of this Critically Endangered bird in recent years.

This site also has five Near Threatened species. Given the extensive habitats, the population of Great Pied Hornbill *Buceros bicornis* and Grey-headed Fish-eagle *Ichthyophaga ichthyaetus* could be significant, although both were considered rare by Joshua & Johnsingh (1988).

OTHER KEY FAUNA

Kalakad-Mundanthurai is one of the best tiger reserves of India (Jain 2001). Besides Tiger *Panthera tigris*, it has Leopard *P. pardus* as the major predator, and ungulates such as Sambar *Rusa unicolor*, Spotted Deer *Axis axis*, Barking Deer *Muntiacus muntjak*, and Mouse Deer *Moschiola indica*. Asiatic Elephant *Elephas maximus*, Gaur *Bos gaurus*, Sloth Bear *Melursus ursinus*, and Indian Giant Squirrel *Ratufa indica* are also reported from this IBA. Five primate species occur in this IBA site: Grey Langur *Semnopithecus entellus*, Nilgiri Langur *Trachypithecus johni*, Bonnet Macaque *Macaca radiata*, Lion-tailed Macaque *M. silenus*, and Slender Loris *Loris tardigradus* (Johnsingh 2001).

Mudappa (2002) reported 10 species of small carnivores from KMTR: Small Indian Civet *Viverricula indica*, Brown Palm Civet *Paradoxurus jerdoni*, Common Palm Civet *P. hermaphroditus*, Stripe-necked Mongoose *Herpestes vitticollis*, Brown Mongoose *H. fuscus*, Ruddy Mongoose *H. smithii*, Jungle Cat *Felis chaus*, Leopard Cat *Prionailurus*



Tea garden landscape in Kalakad-Mundanthurai Tiger Reserve. Large mammals such as elephant, tiger, gaur, and deer use these tea estates as corridors

bengalensis, Rusty-spotted Cat *P. rubiginosus*, and Nilgiri Marten *Martes gwatkinsii*. Among the reptiles, King Cobra *Ophiophagus hannah*, Indian Rock Python *Python molurus*, Monitor Lizard *Varanus bengalensis*, and Draco or Gliding Lizard *Draco dussumieri* are some interesting species found here.

The Western Ghats EBA has c. 120 species of amphibians, of which 90 are restricted to rainforests (Johnsingh 2001). Thirty-two species have been recorded from this site, of which 25 are endemic to the Western Ghats. The Black Narrow-mouthed Frog *Melanobatrachus indicus* was rediscovered after 100 years in Kakachi (Vasudevan 1997). *Dasia halianus*, an arboreal skink, earlier reported only from Sri Lanka, was discovered by Johnsingh & Joshua (1989) from the threatened gallery forest of River Tambiraparani. Recently, a new species of frog *Raorchestes kakachi* was described from the reserve (Seshadri *et al.* 2012).

This site has rich reptilian diversity, with a total of 81 species. Some species of biological and ecological importance include *Calotes andamanensis*, Cochin Forest Cane Turtle *Geoemyda silvatica*, Anaimalai Gecko *Hemidactylus anamallensis*, and Indian Kangaroo Lizard *Otocryptis*

beddomii (Johnsingh 2001).

KMTR is also famous for many rare and endemic hillstream fish of the Western Ghats. Recently, Arunachalam & Johnson (2002) described a new species *Puntius kannikattiensis* from the streams of River Tamiraparani.

Biju *et al.* (2011) conducted a survey in July 2004, which yielded a new species of Night Frog from Kakachi, Tirunelveli district. This species, named *Nyctibatrachus pillaii*, was reported from forested marshy areas or in rivulets of hillstreams.

LAND USE

- Nature conservation and research
- Forestry
- Tourism and recreation

THREATS AND CONSERVATION ISSUES

- Livestock grazing
- Disturbance to birds (poaching)
- Firewood collection

Grazing inside the forest area has been reduced after an ecodevelopment programme was initiated in the surrounding



MRUGANK PRABHU

Rhacophorus calacadensis (Ahl, 1927) is restricted to the Southern Western Ghats. It is found in Agasthyamalai hill range in Kerala and Kalakad Mundanthurai Tiger Reserve in Tamil Nadu

villages, but a few cattle still graze in the back waters of major dams. Additional areas on the western side of the reserve that belonged to Virapuli Reserve Forest, including Muthukuzhi and Winch points, were added to the tiger reserve. The south-western boundary of the reserve is now contiguous with Kanyakumari Wildlife Sanctuary. KMTR has an area of c. 56 km on the western side adjoining Kerala, from where entry is relatively easy due to the existence of private estates nearby. People from across the state border often enter the reserve to carry out illegal activities. Since this area is difficult to access from the Tamil Nadu side, frequent patrolling becomes difficult but is regularly attempted by forest watchers. The cattle population along the boundary of the reserve is now reduced. Some cattle owned by the residents of the State Electricity Board colonies and the tea estate workers within the reserve are still a problem. Fuel wood collection along the eastern boundary has also been drastically reduced.

KEY CONTRIBUTORS

Justus Joshua, A.J.T. Johnsingh, T. Ganesh, P. Jeganathan.

KEY REFERENCES

Arunachalam, M. and Johnson, J.A. (2002) A new species of *Puntius* Hamilton (Pisces: Cyprinidae) from Kalakad-Mundanthurai Tiger Reserve, Tamil Nadu, India. *JBNHS* 99(3): 474–480.

Biju, S.D., Bocxlaer, I.V., Mahony, S., Dinesh, K.P., Radhakrishnan, C., Zachariah, A., Giri, V., and Bossuyt, F. (2011) A taxonomic review of the Night Frog genus *Nyctibatrachus* Boulenger, 1882 in the Western Ghats, India (Anura: Nyctibatrachidae) with description of twelve new species. *Zootaxa* 3029: 1–96.

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Volume 1: Non-passerines. Lynx Edicions, Barcelona.

Jain, P. (2001) Project Tiger Status Report, Project Tiger, Ministry of Environment and Forests, Government of India, New Delhi.

Johnsingh, A.J.T. (2001) The Kalakad-Mundanthurai Tiger Reserve: A global heritage of biological diversity. *Current Science* 80(3): 378–388.

Johnsingh, A.J.T. and Joshua, J. (1989) The threatened gallery forest of the river Tambiraparani, Mundanthurai Wildlife Sanctuary, South India. *Biol. Conservation* 47(4): 273–280.

Joshua, J. and Johnsingh, A.J.T. (1988) Observations on birds on Mundanthurai Plateau, Tamil Nadu. *JBNHS* 85(3): 565–577.

Mudappa, D. (2002) Observations of small carnivores in the Kalakad-Mundanthurai Tiger Reserve, Western Ghats, India. *Small Carnivore Conservation* 27: 4–5.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University, & Lynx Edicions, Washington, D.C., Michigan & Barcelona.

Rahmani A.R. (2012) *Threatened Birds of India – Their Conservation Requirements*. IBCN, BNHS, RSPB, and BirdLife International. Oxford University Press. Pp. xvi + 864.

Seshadri, K.A., Gururaja, K.V., and Aravind, N.A. (2012) A new species of *Raorchestes* (Amphibia: Anura: Rhacophoridae) from mid-elevation evergreen forests of the southern Western Ghats, India. *Zootaxa* 3410: 19–34.

Shankar Raman, T.R. (2001) Observations on the Oriental Bay Owl *Phodilus badius* and range extension in the Western Ghats, India. *Forktail* 17: 110.

Stattersfield, A.J., Crosby, M.J., Long, A.J., and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK.

Vasudevan, K. (1997) Rediscovery of the black microhylid *Melanobatrachus indicus* (Beddome, 1878). *JBNHS* 94(1): 170.

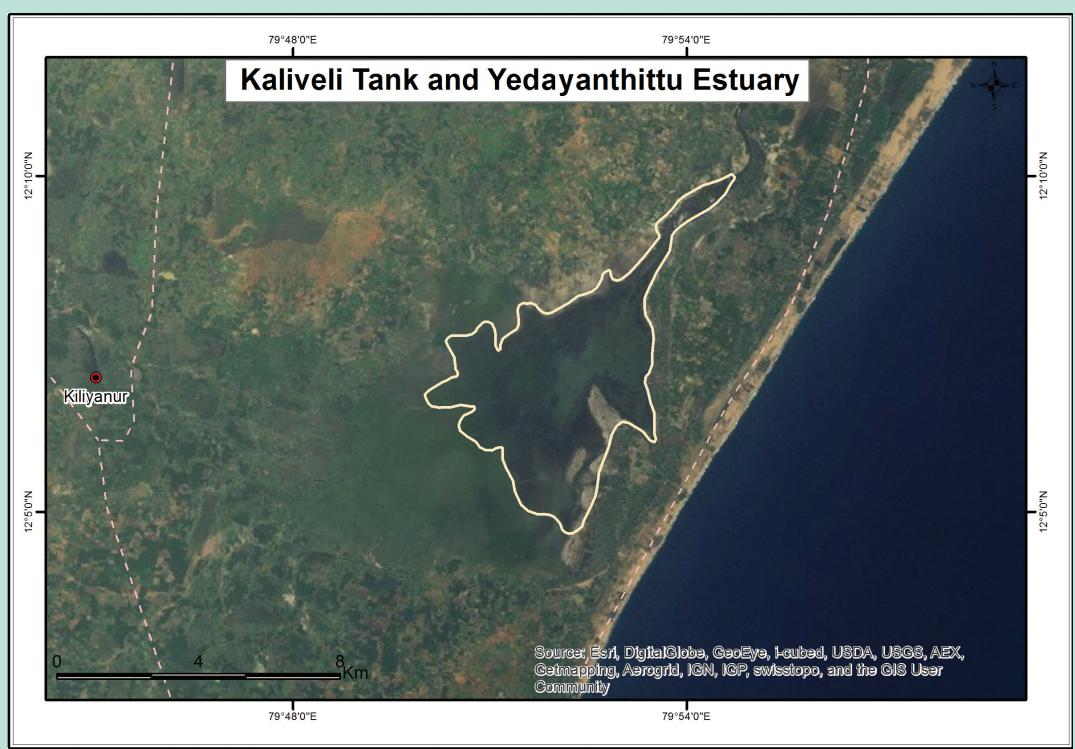
KALIVELI TANK AND YEDAYANTHITTU ESTUARY

IBA Site Code	: IN-TN-12
Administrative Region (State)	: Tamil Nadu
District	: Cuddalore
Coordinates	: 12° 10' 00" N, 79° 49' 60" E
Ownership	: State and private
Area	: 7,500 ha (13,160 ha)?

Altitude	: 0–1 msl
Rainfall	: 1,200 mm
Temperature	: 28 °C to 39 °C
Biogeographic Zone	: Deccan Peninsula
Habitats	: Freshwater Reservoir, Seasonal Lagoon

IBA CRITERIA : A1 (Threatened species), A4i (1% of biogeographic population), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS : Not officially protected.



GENERAL DESCRIPTION

Kaliveli Tank is a semi-permanent, fresh to brackish water lagoon, which empties into the sea through a narrow channel connecting the tank with the Yedayanthittu Estuary to the northeast. The water level in the tank fluctuates according to the precipitation. The tank reaches its maximum extent at the end of the northeast monsoon, and in years of low rainfall, dries out completely for a few months during the summer. At such times, expansion of paddyfields reduces the size of the tank by as much as one third. The average depth of water at the end of the monsoon is c. 1 m, and the maximum after heavy rainfall c. 2 m. By the end of the monsoon, the lagoon is normally full of fresh water, with the run-off from neighbouring farmland. Subsequently, as the inflow of fresh water diminishes,

there is some inflow of sea water from the estuary, and the lagoon becomes brackish, particularly at its northern end. The lagoon is occasionally flooded with sea water during cyclonic disturbances (Scott 1989).

Yedayanthittu Estuary lies c. 3 km to the northeast of the tank. This estuary has large areas of intertidal mudflats, but only tiny relicts of the once extensive mangrove forests remain. There are some 500 ha of salt pans alongside the estuary, immediately north of the Marakkanam road bridge across a channel from Kaliveli Tank.

Until about 35 years ago, the entire region was heavily forested, but almost all the forest has been cleared, and the tank and estuary are now surrounded by cultivation and thorny scrub woodland. There are some low sand dunes by the channel, linking the tank to the estuary. The Kaliveli



V. THAYUDHIN PHOTO LIBRARY

Near Threatened Black-headed Ibis *Threskiornis melanocephalus* is seen in this IBA

watershed extends from Auroville Plateau south for c. 30 km and has an area of c. 25,000 ha (Scott 1989).

Islam & Rahmani (2008) recommended Kaliveli Tank and Yedayanthittu Estuary as a Ramsar Site, as this IBA qualifies for Ramsar Criteria 2 (wetland supports threatened ecological communities), Criteria 5 (wetland regularly supports 20,000 or more waterbirds), and Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies). This IBA can be classified as Ramsar Wetland Type 6 (water storage impoundment).

The vegetation in the southern part of the IBA consists of shallow reed beds, groves of thorny scrub, *Acacia nilotica* and *Prosopis* sp. trees, with fallow land and arable pastures which are extensively cultivated for paddy. The northern part is exclusively salt pans (mudflats) and scanty mangrove patches. *Acacia nilotica* groves harbour large roosts of Black-crowned Night-heron *Nycticorax nycticorax*, mixed roosts of Spot-billed Pelican *Pelecanus philippensis* (about 300 individuals), Painted Stork *Mycteria leucocephala*, Oriental Darter *Anhinga melanogaster*, and cormorants. Neem trees located on the edges of the wetland have roosts of Asian Openbill *Anastomus oscitans*. As the lake fills up with fresh water in November, numerous aquatic plants germinate. Amongst the many species of algae in the brackish areas, *Enteromorpha intestinalis* is particularly common. There are extensive reedbeds and sedges in the less saline areas.

AVIFAUNA

The tank and the estuary are extremely important staging and wintering areas for a large variety of migratory waterfowl (Pieter 1987, Scott 1989). Pieter (1987) recorded 105 species of waterbirds and terrestrial birds, while Perennou (1987) noted 78 species of waterfowl, including 13 species of Anatidae and 30 species of shorebirds. The area

regularly holds over 30,000 ducks in winter, 20,000–40,000 shorebirds, and 20,000–50,000 terns during the migration period. Pieter (1987) noted about 40,000 birds in the tank, and another 20,000 in the estuary. Although the number of species is consistent during this period, their populations do fluctuate. It is assumed that there is a continuous movement of various species between Point Calimere and Vedanthangal (both IBAs) and Kaliveli Tank (Pieter 1987).

In March and April, as the water level recedes, the lagoon attracts large congregations

of pelicans, herons, egrets, storks, and ibises. Spot-billed Pelican *Pelecanus philippensis* is a regular visitor in flocks of 30–200 individuals, and Greater Flamingo *Phoenicopterus roseus* sometimes occurs in very large numbers. The first flock of Greater Flamingo usually arrives in late November or early December, and numbers build up to a peak of 6,000–7,000 in March and April. In 1987–1988, 200 Spot-billed Pelican (1% threshold is 100: Wetlands International 2012), 30 Ruddy Shelduck *Tadorna ferruginea*, 1,000 Asian Openbill *Anastomus oscitans*, 3,500 Red-crested Pochard *Netta rufina*, and some shorebirds like Little Stint *Ereunetes minutus* (4,000–5,000; 1% threshold is 2,400: Wetlands International 2012), Curlew Sandpiper *Erolia ferruginea* (350), Lesser Sand Plover *Charadrius mongolus* (280) reported by Scott (1989). Perennou (1989) found three Greater Spotted Eagle *Clanga clanga* spending the whole winter in Kaliveli in 1986–1987. Their present status is not known.

According to recent observations by Lekshmi (unpublished) between 2011–2014, the maximum number of birds can be sighted in winter, with wintering duck population reaching c. 10,000, the majority being Northern Pintail *Anas acuta* (c. 5,000 sighted in December, 2011) and Garganey *Querquedula querquedula*, usually foraging with Eurasian Coot *Fulica atra* (c. 500 sighted in January, 2011). Eurasian Wigeon *Anas penelope*, Gadwall *A. strepera*, Northern Shoveller *A. clypeata*, Knob-billed or Comb Duck *Sarkidiornis melanotos*, Large Whistling-duck *Dendrocygna bicolor*, and Lesser Whistling-duck *D. javanicus* (400 in April, 2013) are regular visitors in moderate numbers, with Comb Duck and Whistling Ducks observed mid February onwards in all years. Two or three Barheaded Goose *Anser indicus* were sighted in 2012 and 2013.

Waders that congregate in the southern part of the IBA include Grey-headed Lapwing *Vanellus cinereus*, Black-

tailed Godwit *Limosa limosa*, Common Greenshank *Tringa nebularia*, Lesser Sand Plover *Charadrius mongolus*, Kentish Plover *Charadrius alexandrinus*, Eurasian Curlew *Numenius arquata*, Pacific Golden Plover *Pluvialis fulva*, Curlew Sandpiper *Calidris ferruginea*, Pintail Snipe *Gallinago stenura*, Swinhoe's Snipe *G. megala*, and Jack Snipe *Lymnocryptes minimus*. Stints and Common Redshank *Tringa totanus* (only in prawn farms) are rare, and Ruff *Philomachus pugnax* is uncommon. According to R. Lekshmi (*pers. comm.* 2014), from 2011 the number of Grey-headed Lapwing visiting Kaliveli has increased, from 11 in 2011 to 67 in 2013, which stay throughout winter. The site could possibly be the southernmost limit of wintering Eurasian Curlew *Numenius arquata*. Noisy flocks of 70–150 were observed from December to February, 2011–2014. A large flock of Greater Short-toed Lark *Calandrella brachydactyla* (700) was sighted once in February, 2013. Apart from wintering Richard's Pipit *Anthus richardi*, this part of Kaliveli (and sand dunes) is a favourite site of Tawny Pipit *Anthus campestris*. The Near Threatened Pallid Harrier *Circus macrourus* (six birds sighted in February, 2013), Eurasian Spoonbill *Platalea leucorodia* (nine birds seen in February, 2013) are regular winter visitors, while Lesser Flamingo *Phoeniconaias minor* (sighted in May, 2014) and Greater Spotted Eagle *Clanga clanga* are occasional visitors. The Greater Spotted was sighted only once during the period (two in 2011).

Spot-billed Pelican *Pelecanus philippensis* is a common resident of Kaliveli, with a major roost holding over 300 pelicans, which forage in Bahour and Ousteri IBAs in Pondicherry as well. At Kaliveli, Spot-billed Pelicans prefer to forage in abandoned prawn farms and drying up pools in the company of Painted Storks. In summer, congregations of Greater Flamingo *Phoenicopterus roseus* (2,000 birds sighted in March, 2014), Black-headed Ibis *Threskiornis melanocephalus* (400 birds sighted in May, 2014), Lesser Flamingo (34 seen in May, 2014), along with a few over-summering waders (Eurasian Curlew, Pied Avocet *Recurvirostra avosetta* and Grey Heron *Ardea cinerea*). Glossy Ibis *Plegadis falcinellus* are present throughout the year, except for a few months in summer (May to August), and seem to make local movements to nearby wetlands (R. Lekshmi, *pers. comm.* 2014).

Whiskered Tern *Chlidonias hybrida* are abundant in harvested paddyfields and prawn farms, while Common Tern *Sterna hirundo* almost exclusively prefer prawn farms for foraging. Another interesting observation is the local movement of Pheasant-tailed Jacana *Hydrophasianus chirurgus* in the reed beds in small flocks of about 30 birds (February, 2013) and Yellow-wattled Lapwing *Vanellus malabaricus* (more than 100 birds in November, 2011) in the paddyfields of Kaliveli in winter (R. Lekshmi, *pers. comm.* 2014).

VULNERABLE	
Greater Spotted Eagle	<i>Clanga clanga</i>
NEAR THREATENED	
Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Lesser Flamingo	<i>Phoeniconaias minor</i>
Pallid Harrier	<i>Circus macrourus</i>

R. Lekshmi's observations show that the salt pans of Marakkanam in Kaliveli floodplain are a favourite stop-over site for waders. Sometimes more than 30,000 waders are seen in winter. About 3,000 Pacific Golden Plover *Pluvialis fulva*, 1,500 Ruff *Philomachus pugnax*, 700 Common Redshank *Tringa totanus*, 1,000+ Little Stint *Ereunetes minutus*, 500 Marsh Sandpiper *Tringa stagnatilis*, 2,000 Lesser Sand Plover *Charadrius mongolus*, 100 Kentish Plover *Charadrius alexandrinus*, five Whimbrel *Numenius phaeopus*, and 150 Black-winged Stilt *Himantopus himantopus* were seen from December 2010 to February, 2011. Terek Sandpiper *Xenus cinereus*, Broad-billed Sandpiper *Calidris falcinellus* (in September), Asian Dowitcher *Limnodromus semipalmatus*, Grey Plover *Pluvialis squatarola*, and Red-necked Stint *Calidris ruficollis* were sighted only once during 2011–2014, mostly in May, 2014.

In September, terns started to arrive in thousands, mainly Common Tern (>100 sighted in September, 2014), Caspian Tern *Hydroprogne caspia* (>200 birds counted in September, 2014), Gull-billed Tern *Gelochelidon nilotica* (>500 birds in September, 2014), and possibly Little Tern *Sternula albifrons* (unconfirmed record). In December, hundreds of Brown-headed Gull *Larus brunnicephalus* were sighted in the estuary and flooded salt pans. Black-headed Gull *Larus ridibundus*, Slender-billed Gull *L. genei*, Heuglin's Gull *L. heuglini*, and Sandwich Tern *Thalasseus sandvicensis* are often seen in the estuary. The salt pans and estuary also support good numbers of Western Reef-egret *Egretta gularis*. Ashy-crowned Sparrow-lark *Eremopterix griseus* are found in large flocks of >300 birds in the Marakkanam salt pans and sand dunes, in comparison with small flocks (20–30 birds) that visit the southern paddyfields during harvest. Between June and September, the mudflats dry up completely and any remaining water is drained for salt harvesting. In June-July, there are virtually no birds except the breeding Black-winged Stilt in July-August. When water level is low in the estuary in summer, a few Spot-billed Pelican, Painted Stork, and Asian Openbill can be seen (R. Lekshmi, *pers. comm.* 2014).

This site easily qualifies for A4i (1% of biogeographic population) and A4iii (>20,000 waterbirds) criteria. Due

to the presence of globally Threatened and many Near Threatened species, it also qualifies for A1 (Threatened species) criteria.

OTHER KEY FAUNA

The area was formerly heavily forested, but now only fragments remain. An 18th century stone inscription found close to the tank shows a king hunting elephants in the surrounding forests! Now, only a few Golden Jackal *Canis aureus* and Black-naped Hare *Lepus nigricollis* would be seen.

LAND USE

- Fisheries
- Prawn farms
- Agriculture
- Salt pans
- Oyster harvesting
- Resorts

THREATS AND CONSERVATION ISSUES

- Poaching
- Reed harvesting
- Reclamation and land conversion
- Resorts
- Film shooting
- Pollution
- Pesticides
- General hostility of local community to conservationists

Due to its proximity to East Coast Road (ECR) and lack of official protection, Kaliveli is under severe pressure for conversion into resorts and other building projects. One project, Emerald Village, has already destroyed acres of arable land at Koonimedu in South Kaliveli, where Grey-headed Lapwing, Eurasian Curlew, and Asian Openbill used to forage. Another resort is under construction in a nearby location (ironically involves construction of private artificial wetland to attract birds), destroying prime foraging ground of hundreds of Asian Openbill. Another issue is the local community's dependency for livelihood that has turned into unsustainable resource extraction, and the local community being hostile to intervention by the Forest Department, which is seen as a threat to many illegal prawn farms operating in the area. Hundreds of hectares of reed beds were recently dredged to create a prawn farm inside the core wetland in the summer of 2014, due to which thousands of waterfowl may lose their wintering habitat. The reduction in the size of the wetland will reduce the flock size of ducks attracted to the wetland in winter. In areas where

the wetland fringes support hundreds of waders, much of the land has been earmarked for sale, and some areas are already being levelled (as of 2014). Eurasian Curlew, which shows amazing wintering site fidelity, seems to have lost its strongholds to construction activities.

Pesticide-based farming may be another threat. One juvenile Brahminy Kite showing signs of poisoning and several carcasses of kites were recovered from Koonimedu site of Kaliveli. There was a threat from movie making in an incident in 2012 at Kaliveli, when the filming of a war scene involving large-scale noise, blasts, and other disturbances was promptly reported by some conservationists, followed by immediate action from the Forest Department. The foremost issue is the change in attitude of younger generations of the local community, who aspire to a modern lifestyle with comforts, generally apathetic to the concept of sustainability. The threats that Kaliveli faces now are the repercussions of this attitude. Egrets, for example, are treated as a delicacy to be killed for the table. Though the Forest Department has earnestly attempted to protect the core wetland by dredging out the boundaries and by planting trees, this effort may not be fruitful without community co-operation. Community awareness campaigns and capacity building in bird identification and training as tourist guides would provide village youths with alternative livelihoods, which may help in developing a pro-conservation attitude. Legal protection status, permitting sustainable resource extraction, and traditional activities by the local community seem to be the ideal solution. The northern Kaliveli saltponds were found to be not under threat from traditional resource extraction practices.

KEY CONTRIBUTORS

M. Krishnan, Craig Robson, C. Perennou, R. Lekshmi.

KEY REFERENCES

Islam, M.Z. and Rahmani, A.R. (2008) *Potential and Existing Ramsar Sites in India*. Indian Bird Conservation Network, Bombay Natural History Society, BirdLife International and Royal Society for the Protection of Birds. Oxford University Press. Pp. 592.

Perennou, C. (1987) Two important wetlands near Pondicherry. *Blackbuck* 3(3&4): 3–11.

Perennou, C. (1989) Southern wintering range of some waterbirds. *JBNHS* 86: 247–248.

Pieter (1987) Kaliveli Tank and Yedayanithittu Estuary – a little known wetland habitat in Tamil Nadu. *JBNHS* 84: 210–214.

Scott, D.A. (1989) *A Directory of Asian Wetlands*. IUCN, Gland, Switzerland. Pp. xiv + 1181.

Wetlands International (2012) *Waterbird Population Estimates: Fifth Edition*. Wetlands International Global Series No. 12. Wageningen, The Netherlands. (online edition)

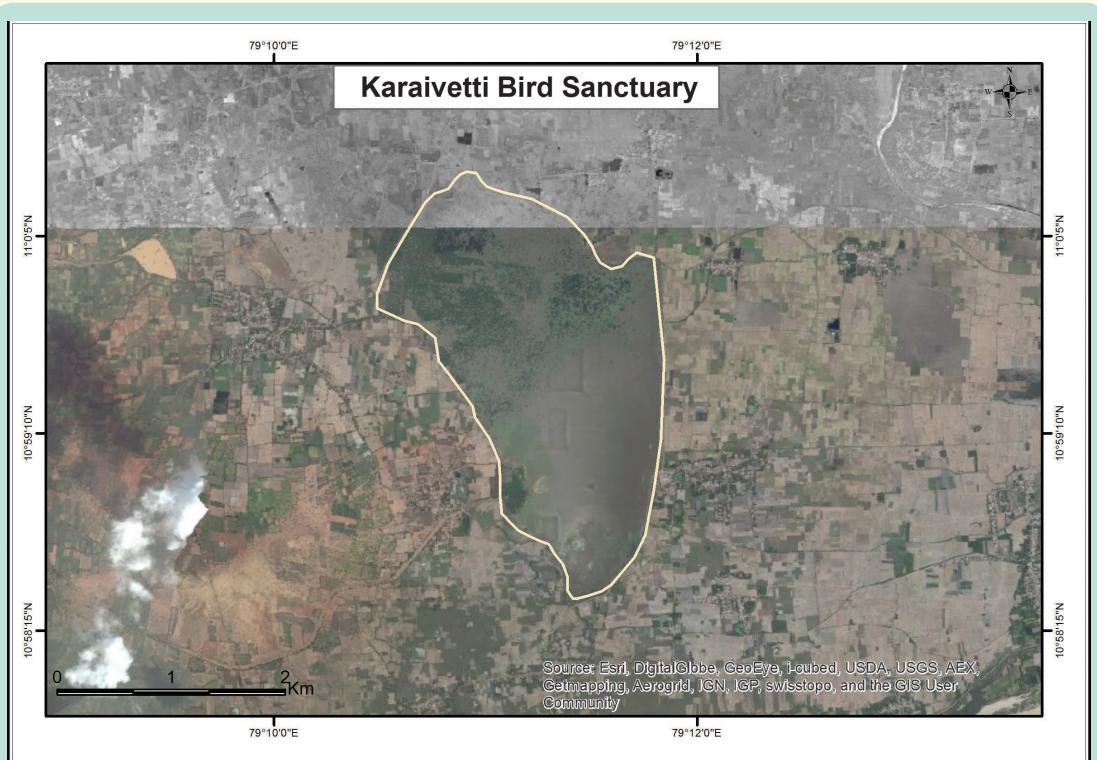
KARAIVETTI BIRD SANCTUARY

IBA Site Code	: IN-TN-13
Administrative Region (State)	: Tamil Nadu
District	: Ariyalur
Coordinates	: 10° 58' 01" N, 79° 11' 07" E
Ownership	: State

Area	: 454 ha
Altitude	: Not Available
Rainfall	: 800–2,000 mm
Temperature	: 24 °C to 41°C
Biogeographic Zone	: Deccan Peninsula
Habitats	: Freshwater Reservoir

IBA CRITERIA : A1 (Threatened species), A4i ($\geq 1\%$ biogeographic population), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS : Wildlife Sanctuary, established April, 1989.



GENERAL DESCRIPTION

Ariyalur district of Tamil Nadu has a limited number of irrigation reservoirs, fed by the River Kaveri and by rain water. Karaivetti is one such lake, c. 50 km northeast of Tiruchirapalli town. This freshwater lake is fed by Pullambadi and Kattalal canals. It is the largest waterbody in the district and attracts hundreds of thousands of birds every year. Considering its importance as a bird habitat, the Government of Tamil Nadu declared it as a wildlife sanctuary in 1999. When full, the lake can hold water to an average depth of 3 m (Anon. 1993). From April to August, the water level is low.

The wetland qualifies for Ramsar Criteria 2 (wetland supports threatened ecological communities), Criteria 6 (wetland regularly supports 1% of the individuals in a

population of one species or subspecies), and Criteria 5 (wetland regularly supports $\geq 20,000$ or more waterbirds) (Islam & Rahmani 2008).

In the dry northern part of the lake, cotton, castor, maize, gram, and coriander are cultivated annually, while in the wetter southern part, paddy and sugarcane are cultivated. The natural and planted vegetation consists of *Acacia nilotica*, *Prosopis chilensis*, *Azadirachta indica*, and *Tamarindus indica*. The *Acacia nilotica* plantation is a major nesting site for birds. In the wetland, *Typha angustata* and *Fimbristylis* sp. are present. *Ipomoea aquatica* grows as a weed in many parts of the reservoir. Floating and partly submerged plants include species of genera *Elodea*, *Hydrilla*, *Salvinia*, and *Spirodella*.

AVIFAUNA

A total of 188 species of birds, including 101 migrants, has been identified from Karaivetti Lake (Anon. undated, Relton 1998). However, a recent study showed that the lake harbours a total of 149 species of birds (76 migrants and 57 residents) from 104 genera, 49 families, and 18 orders (Gokula 2013). Fifteen species of ducks have been identified from this IBA site, the majority consisting of Garganey *Querquedula querquedula*, Northern Pintail *A. acuta*, Northern Shoveller *Spatula clypeata*, and Spot-billed Duck *A. platyrhynchos*. Up to 1,000 Bar-headed Goose *Anser indicus* are found in some years: the 1% population threshold for this species is 560 (Wetlands International 2012).

Gokula (2011 a – d) conducted studies on the Spot-billed Pelican *Pelecanus philippensis*. Gokula (2011 b, c) found 559 birds in June, 2010. A few White Stork *Ciconia ciconia* (seven recorded in October, 2000, two in January, 2009) are also found, but the number is much less than its 1% threshold of 45 individuals.

Sixteen species of waterbirds breed here. Among them are the Spot-billed Pelican (56 nests recorded in November, 2009), Black-headed Ibis *Threskiornis melanocephalus*, Painted Stork *Mycteria leucocephala*, and Oriental Darter *Anhinga melanogaster*. Eurasian Spoonbill *Platalea leucorodia* also breeds in this site.

Gokula (2013) reported the occurrence of threatened bird species, including Asian Woollyneck *Ciconia episcopus*, Black-bellied Tern *Sterna acuticauda*, River Tern *Sterna aurantia*, Black-tailed Godwit *Limosa limosa*, and Pallid Harrier *Circus macrourus*.

During winter, the total number of birds recorded is between 20,000 and 60,000, mostly Anatidae. Therefore, this site qualifies for A4iii criteria, besides qualifying on the basis of criteria A1 (Threatened species) and A4i ($\geq 1\%$ biogeographic population). Greater Spotted Eagle *Clanga clanga* is regularly seen in winter.

OTHER KEY FAUNA

As this is a lake eco-system, not much terrestrial fauna is present, except for some Golden Jackal *Canis aureus* and

VULNERABLE

Greater Spotted Eagle	<i>Clanga clanga</i>
Asian Woollyneck	<i>Ciconia episcopus</i>

ENDANGERED

Black-bellied Tern	<i>Sterna acuticauda</i>
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NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Spot-billed Pelican	<i>Pelecanus philippensis</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Black-tailed Godwit	<i>Limosa limosa</i>
Pallid Harrier	<i>Circus macrourus</i>
River Tern	<i>Sterna aurantia</i>

Black-naped Hare *Lepus nigricollis* in the scrub patch and plantation. However, the lake supports 15 species of fish.

LAND USE

- Agriculture
- Watershed management

THREATS AND CONSERVATION ISSUES

- Grazing
- Disturbance to birds

The Forest Department permits the local people to fish in April and May, with a ban on fishing in the daytime, and no fish less than 250 gm to be caught. However, this regulation is not being enforced effectively. As a result, fishing occurs throughout the day and all sizes of fish are caught with impunity. During summer, when the water level is low and a large part of the lake dries up, cattle graze in the area. This activity is not harmful *per se*, but the number of cattle should be regulated to avoid overgrazing.

With its enormous and varied populations of birds, Karaivetti Bird Sanctuary has great potential to attract birdwatchers and tourists. There is a need to establish a nature interpretation centre to show the importance of the wetland and waterfowl to the general public.

KEY CONTRIBUTORS

- A. Relton, V. Gokula.

KEY REFERENCES

Anon. (1993) *Directory of Indian Wetlands*, 1993. WWF India, New Delhi and Asian Wetland Bureau, Kuala Lumpur.

Anon. (undated) Karaivetti Bird Monitoring Project. Nature Club, Bishop Heber College, Tiruchirappalli. Pp. 19.

Gokula, V. (2011a) An ethogram of Spot-billed Pelican *Pelecanus philippensis* in Karaivetti Bird Sanctuary, Tamil Nadu, India. *Chinese Birds* 2(4): 183–192.

Gokula, V. (2011b) Breeding biology of Spot-billed Pelican *Pelecanus philippensis* in Karaivetti Bird Sanctuary, Tamil Nadu, India. *Chinese Birds* 2(2): 101–108.

Gokula, V. (2011c) Nocturnal foraging by Spot-billed Pelican *Pelecanus philippensis* in Karaivetti Bird Sanctuary, Tamil Nadu, India. *Journal of Marine Ornithology* 39: 267–268.

Gokula, V. (2011d) Status of distribution and potential breeding and foraging sites of Spot-billed Pelican in Tamil Nadu, India. *J. Sci. Trans. Environ. Technov.* 5(2): 59–69.

Gokula, V. (2013) Avifauna of Karaivetti Bird Sanctuary, Tamil Nadu, India. *Zoos' Print Journal* 26(6): 23–29.

Islam, M.Z. and Rahmani, A.R. (2008) *Potential and Existing Ramsar Sites in India*. Indian Bird Conservation Network, Bombay Natural History Society, BirdLife International and Royal Society for the Protection of Birds. Oxford University Press. Pp. 592.

Relton, A. (1998) Threatened birds of Karaivetti Bird Sanctuary, Tiruchirappalli-Tamil Nadu. *Newsletter for Birdwatchers* 38: 21–22.

Wetlands International (2012) *Waterbird Population Estimates: Fifth Edition*. Wetlands International Global Series No. 12. Wageningen, The Netherlands. (online version)

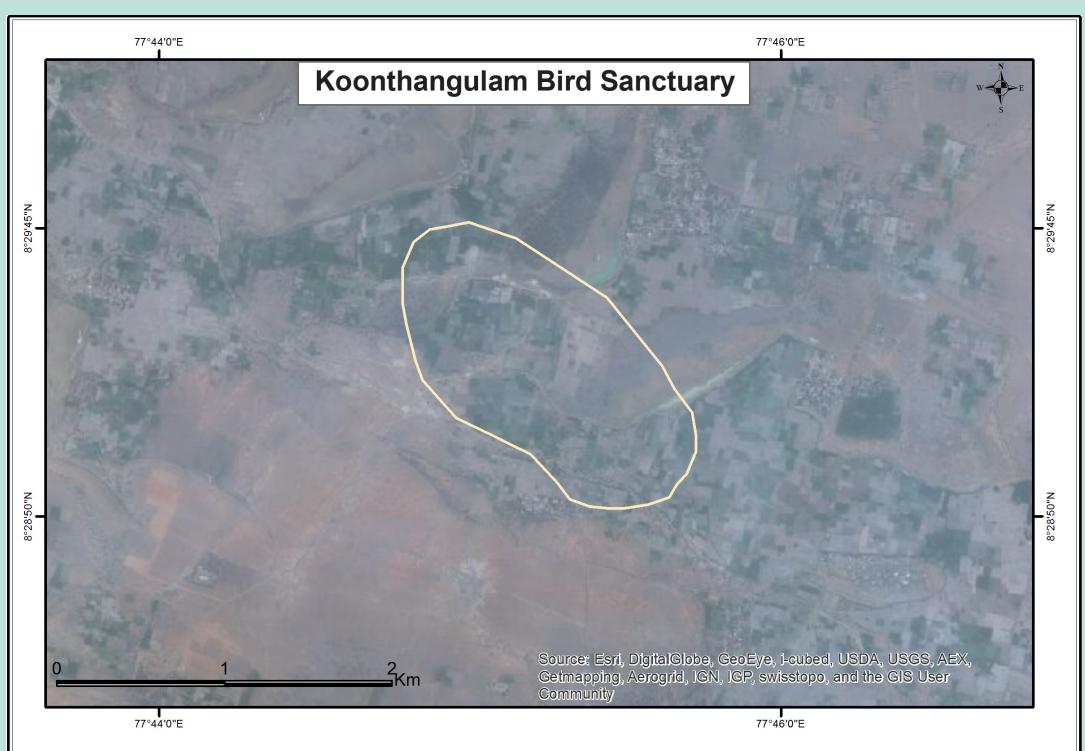
KOONTHANGULAM BIRD SANCTUARY

IBA Site Code	: IN-TN-14
Administrative Region (State)	: Tamil Nadu
District	: Tirunelveli
Coordinates	: 8° 28' 12" N, 77° 43' 48" E
Ownership	: State

Area	: 129.33 ha
Altitude	: Not available
Rainfall	: 750 mm
Temperature	: 31 °C to 34 °C
Biogeographic Zone	: Deccan Peninsula
Habitats	: Freshwater Swamp, Aquatic

IBA CRITERIA : A1 (Threatened species), A4i ($\geq 1\%$ biogeographic population threshold)

PROTECTION STATUS : Wildlife Sanctuary, established November, 1994.



GENERAL DESCRIPTION

Koonthangulam Bird Sanctuary is located in Naguneri taluka of Tirunelveli district, between Moolakaraipatti and Kariandi. It is c. 20 km from Tirunelveli town. It is a rain and river-fed freshwater tank, and receives water from the Manimuthar river. The Spot-billed Pelican *Pelecanus philippensis* breeds here, along with other birds. It is one of the oldest known pelicanries in India, in existence for 200 years or more. Rhenius (1907) first reported this pelicanry in 1906. The villagers believe that the birds that come to Koonthangulam are harbingers of good luck and their yearly arrival ensures good rainfall. They benefit from the rich guano deposited in the breeding colonies, which is used to fertilize the fields. Guano-rich tank water is also

used for irrigation. Koonthangulam (also transcribed as Koondakulam) has a large tank within the village precincts, and several smaller tanks scattered in the vicinity. These waterbodies and the fields are the main foraging grounds for birds. Koonthangulam is essentially an agricultural area, so there is no forest as such. *Acacia nilotica* has been planted in about 35.5 ha, where most of the birds nest.

The site comprises three adjacent freshwater wetlands (ponds) namely Koonthangulam, Kadankulam, and Silayamkulam, which cover an area of 129.33 ha. Koonthangulam and Kadankulam have already been declared as a bird sanctuary, with an area of c. 130 ha. Silayam pond has been included in the proposed site because it is less than half a kilometre from Koonthangulam pond,

and because birds move freely between all three wetlands. This wetland complex is about 9 km east northeast of Nanguneri (off National Highway-7), and is located in Tirunelveli district in Tamil Nadu. These wetlands serve as irrigation tanks for paddy cultivation; the Public Works Department supplies water to these wetlands in alternate years from Manimuthar Reservoir. More than 43 species of waterbirds, both resident and migratory, visit the site every year in January–February, and depart in July–August after nesting, hatching, and nurturing their young (Tamil Nadu Forest Department data, 2014). Koonthangulam tank has a large plantation of *Acacia nilotica*, which provides highly preferred nesting sites for various species of heronry birds. The prominent breeding birds at the heronries are the Painted Stork *Mycteria leucocephala*, Spot-billed Pelican, Asian Openbill *Anastomus oscitans*, Eurasian Spoonbill *Platalea leucorodia*, Black-headed Ibis *Threskiornis melanocephalus*, Glossy Ibis *Plegadis falcinellus*, three species of cormorants, Oriental Darter *Anhinga melanogaster*, and four species of egrets. Painted Stork also nests in thousands close to houses in the villages of Koonthangulam area. The villagers have traditionally protected these birds.

AVIFAUNA

The pelicanry at Koonthangulam is quite famous and commented upon by various naturalists (Rhenius 1907, Webb-Peploe 1945, Wilkinson 1961, Nagulu & Rao 1983, Kumar 1993, Thomas *et al.* 2000). In the early 1990s, c. 1,000 Spot-billed Pelican were recorded (Anon. 1993). This constitutes more than 8% of the biogeographic population. During a pelican survey in January, 2003, only 452 Spot-billed Pelican were recorded breeding. BirdLife International (2001) has listed records of pelicans from 1906 till 1993 from this site.

Besides the Spot-billed Pelican, Painted Stork breeds in the village in large numbers, sometimes on the trees inside private property. In some years, Greater Flamingo *Phoenicopterus roseus* also built nest mounds, though breeding was not confirmed. Asian Openbill, Black-headed Ibis, Red-naped Ibis *Pseudibis papillosa*, Glossy Ibis *Plegadis falcinellus*, Eurasian Spoonbill *Platalea leucorodia*, Little Cormorant *Microcarbo niger*, Pond-heron *Ardeola grayii*, Grey Heron *Ardea cinerea*, Black-crowned Night-heron *Nycticorax nycticorax*, Oriental Darter *Anhinga melanogaster*, Little Egret *Egretta garzetta*, Cattle Egret



In some years due to lack of rainfall, Koonthangulam remains dry and there is no breeding of colonial birds in this IBA

Bubulcus ibis, Bar-headed Goose *Anser indicus*, Northern Pintail *Anas acuta*, Northern Shoveller *Spatula clypeata*, Little Grebe *Tachybaptus ruficollis*, Eurasian Coot *Fulica atra*, White-breasted Waterhen *Amaurornis phoenicurus*, Common Moorhen *Gallinula chloropus*, Purple Swamphen *Porphyrio porphyrio*, and various species of waders are also seen here, many in numbers greater than their 1% biogeographic population threshold.

This IBA site is famous for its vast flocks of Glossy Ibis *Plegadis falcinellus*, sometimes up to 1,000 seen together, foraging in the inundated crop fields or flying from one foraging area to another.

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Spot-billed Pelican	<i>Pelecanus philippensis</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>

OTHER KEY FAUNA

Most of the smaller mammals of rural areas are seen in this site, such as Golden Jackal *Canis aureus*, Common Palm Civet *Paradoxurus hermaphroditus*, and Jungle Cat *Felis chaus*.

LAND USE

- Irrigation
- Water management



ICCN-BNHS COLLECTION

Paul Pandian has spent all his life protecting pelicans and other birds

THREATS AND CONSERVATION ISSUES

- Encroachment on the upper (inflow) sides of the tank
- Excessive spread of exotic invasive vegetation,
- Anthropogenic disturbance to birds
- Irregular water supply, which directly affects food supply for fish-eating birds and nesting sites for large colonial nesters.



ASAD R. RAHMANI

During good rainfall years, hundreds of Spot-billed Pelican *Pelecanus philippensis* and other species breed in Koothangulam

Koonthangulam is c. 65 km from Kanyakumari, a major tourist destination, from where thousands of people, especially school groups, come every year. Koonthangulam receives about 15,000 Indian tourists and about 100 foreigners annually. Thus, it has enormous potential to become a major centre for environmental education for students and the general public. However, as the villagers are very sensitive to the protection of 'their' birds, crass tourism should be avoided. Regulated guided tours, watching birds from selected points, and an interpretation centre would help in conveying the message of environmental education. A system should be developed so that at least half of the revenue from tourism should go to the *panchayat* (village council) for the development of social infrastructure. Local youth could be trained as guides.

Koonthangulam, Kadankulam and Silayamkulam are irrigation tanks, and the water stored here is released into the adjoining paddyfields for irrigation, to the extent required. During normal monsoons, the water is sufficient for the farmers and for the wetland birds that depend upon the tanks. Since there is only one crop a year, the farmers do not demand much water. They also benefit much from the rich organic manure content of the bird droppings that are in the water from these wetlands. Therefore, they are highly supportive of the birdlife in the sanctuary.

As the birds forage in agricultural fields, it is absolutely necessary to monitor pesticide use in the area. Regular scientific monitoring of birds, both breeding and wintering species, is required. It is also recommended that this IBA site should be kept natural, and no attempt should be made to 'beautify' the place. Potential threats include construction of residential and hotel accommodation close to the boundary of the IBA site. Based on the recommendations of Institute for Restoration of Natural Environment (Grubh 2004), the Tamil Nadu Forest Department (Wildlife) has begun ecological restoration and wildlife tourism development activities within the sanctuary.

According to Augustine *et al.* (2014) the water samples from Purakkad and Koonthangulam shows relatively higher concentrations of nitrate. Its long-term impact on birds has not been studied.

KEY CONTRIBUTORS

V. Kannan, Robert Grubh.

KEY REFERENCES

Anon. (1993) *Directory of Indian Wetlands, 1993*. WWF India, New Delhi and Asian Wetland Bureau, Kuala Lumpur.

Augustine, C., George, J.B., Cyril, N., and Mary, M.C. (2014) Nutrient composition and physicochemical characteristics in the destination sites of migratory water birds: A case study at the selected locations of seashores and lakes in Southern India. *International Journal of Environment* 3(1): 68–77.

BirdLife International (2001) *Threatened Birds of Asia: The BirdLife International Red Data Book*. BirdLife International, Cambridge, UK.

Grubh, R.B. (2004) Developing Koonthakulam as a Tropical Freshwater Wetland Bird Sanctuary – An Ecological Report. Institute for Restoration of Natural Environment, Christopher Nagar, Nagercoil, 629003, T.N., India.

Kumar, S.V. (1993) Koondakulam. *Sanctuary Asia* 14(8): 40–41, 70–73.

Nagulu, V. and Rao, J.V.R. (1983) Survey of south Indian pelicanries. *JBNHS* 80(1): 141–143.

Rhenius, C.E. (1907) Pelicans breeding in India. *JBNHS* 17: 806–807.

Thomas, J., De Britto, A.J., Johnson, J.A., and Sridhar, S. (2000) A preliminary study on the biodiversity of Koonthankulam Bird Sanctuary in Tamil Nadu. *Indian Journal of Environmental Sciences* 4(2): 135–142.

Webb-Peploe, C.G. (1945) Notes on a few birds from south of the Tinnevelly district. *JBNHS* 45: 425–426.

Wilkinson, M.E. (1961) Pelicanry at Kundakulam, Tirunelveli district. *JBNHS* 58: 514–515.

Link: Tamil Nadu Forest Department (2014) http://www.forests.tn.nic.in/wildbiodiversity/bs_kkbs.html

KOTHAGIRI-LONGWOOD SHOLA

IBA Site Code	: IN-TN-15
Administrative Region (State)	: Tamil Nadu
District	: Nilgiris (N. Forest Division)
Coordinates	: 11° 25' 00" N, 76° 52' 00" E
Ownership	: State
Area	: 116 ha

Altitude	: 1,900 msl
Rainfall	: 1,200 mm
Temperature	: 12 °C to 23 °C
Biogeographic Zone	: Western Ghats
Habitats	: Montane Wet Temperate Forest, Tropical Grassland, Tropical Secondary Scrub

IBA CRITERIA: A1 (Threatened species) and A2 (Endemic Bird Area 123: Western Ghats)

PROTECTION STATUS: Not officially protected.

MAP NOT AVAILABLE

GENERAL DESCRIPTION

Longwood is located in the Nilgiris district, at the extreme northwest end of Tamil Nadu. In this site, the only major pocket of natural shola forest remaining is in the immediate vicinity of Kothagiri village. Though relatively small, it is highly important to the whole Kothagiri region as it harbours a variety of endemic flora and fauna. It is also one of the key areas for the conservation of the Endangered Black-chinned (Nilgiri) Laughingthrush *Strophocincla cachinnans*, and Nilgiri Blue Robin *Myiomela major*, and the Vulnerable Nilgiri Wood-pigeon *Columba elphinstonii*, as listed by BirdLife International (2014).

Though it has a history of encroachments and habitat loss, this IBA has ultimately been given much needed protection, with the active involvement of an enlightened group of local residents named Longwood Shola Watchdog Committee.

Like the other sholas of the Nilgiris, Longwood is also classified as Southern Montane Wet Temperate Forest by Champion & Seth (1968). Tall trees of up to 20 m are still seen in this shola. Species comprising forest shola are evergreen and include *Actinodaphne bourdillonii*, *Ilex denticulata*, *Litsea wightiana*, *Michelia nilagirica*, *Microtropis ramiflora*, *Pithecellobium subcoriaceum*, *Symplocos pendula*, *Syzgium arnottianum*, *Eurya nitida*, *Photina notoniana*, *Ternstroemia japonica*, *Berberis tinctoria*, *Hedyotis stylosa*, *Leucas suffruticosa*, and *Smithia blanda*. Many species of Himalayan affinity are found here, as in the whole of the Nilgiris. Tea plantations surround this site.

AVIFAUNA

Longwood Shola is home to several important bird species such as the Nilgiri Wood-pigeon *Columba elphinstonii*, Black-chinned Laughingthrush and the Nilgiri Blue Robin. Of the 26 Western Ghats endemics, 10 have been recorded in this

ENDANGERED

Black-chinned (Nilgiri)	<i>Strophocincla cachinnans</i>
Laughingthrush	
Nilgiri Blue Robin	<i>Myiomela major</i>

VULNERABLE

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
NEAR THREATENED	
Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Malabar Grey Hornbill	<i>Ocyceros griseus</i>
White-bellied Blue Robin	<i>Myiomela albiventris</i>
Black-chinned (Nilgiri)	<i>Strophocincla cachinnans</i>
Laughingthrush	
Black-and-Oufous Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>
Small Sunbird	<i>Leptocoma minima</i>

area. The site is adjacent to the eastern slopes of the Nilgiris and consequently harbours some species of lower elevations, including Yellow-browed Bulbul *Iole indica*, Common Iora *Aegithina tiphia*, White-bellied Blue Flycatcher *Cyornis pallipes*, and Verditer Flycatcher *Eumyias thalassina*. These species are not recorded from the Upper Plateau, except as occasional vagrants (Zarri *et al.* 2004).

This site lies in Biome 10 (Indian Peninsula Tropical Moist Forest) where BirdLife International (undated) has identified 15 species which can be considered as representative of bird assemblages of this biome. Most of them are lower elevation (<1,500 m) birds. Two of these biome species, White-cheeked Barbet *Megalaima viridis* and Indian Scimitar-babbler *Pomatorhinus horsfieldii*, have been recorded here.



DHRTIMAN MUKHERJEE

Longwood Shola is one of the best protected sholas of the Nilgiris. It has tall trees of up to 20 m. Nine endemic birds of the Western Ghats have been identified in this area

Like the other sholas of the Western Ghats, this site is also an important wintering habitat for many migrants from the Himalaya, such as Tickell's Leaf-warbler *Phylloscopus affinis*, Large-billed Leaf-warbler *Phylloscopus magnirostris*, Brown-breasted Flycatcher *Muscicapa muttui*, Blue-headed Rock-thrush *Monticola cinclorhynchus*, and Indian Blue Robin *Luscinia brunnea*. These birds are found in Biome 7 (Sino-Himalayan Temperate Forest) and Biome 8 (Sino-Himalayan Sub-tropical Forest).

Despite its small size (116 ha), Longwood Shola qualifies for two criteria of the IBA selection process – A1 (Threatened species) and A2 (Endemic Bird Area 123: Western Ghats).

OTHER KEY FAUNA

The small size of Longwood Shola and its isolation from the neighbouring sholas limits the population of most of the large animals. Leopard *Panthera pardus* and Tiger *P. tigris* are rarely seen, even though their prey Sambar *Rusa unicolor* and Barking Deer *Muntiacus muntjak* are relatively common. Other mammal species include Gaur *Bos gaurus*, Mouse Deer *Moschiola indica*, Wild Boar *Sus scrofa*, Indian Crested Porcupine *Hystrix indica*, Bonnet Macaque *Macaca radiata*, Indian Giant Squirrel *Ratufa indica*, and Black-naped Hare *Lepus nigricollis*.

One of the 12 new species of Night Frog described by Biju

et al. (2011) is reported from this IBA. In a survey conducted in July, 2004 in Longwood Shola, Kothagiri, *Nyctibatrachus indranieili* was discovered. An interesting species, Nilgiri Dancing Frog *Micrixalus phyllophilus*, is found here. It is endemic to the Western Ghats.

LAND USE

- Forestry
- Conservation
- Water catchment

THREATS AND CONSERVATION ISSUES

- Anthropogenic pressure
- Infestation by alien plant species
- Extensive use of pesticides in the tea gardens
- Disproportionate increase in the population of House Crow

There is tremendous increase in anthropogenic pressure on this IBA from the settlements surrounding it. Apparently, its small size and isolation from other shola habitats is a problem for the long-term conservation of several bird species with weak flight, such as Black-chinned Laughingthrush and Nilgiri Blue Robin because they may not be able to move to another suitable habitat if this shola forest is degraded.

Invasion by alien species such as *Cestrum auranticum* has reportedly affected considerable areas of the natural habitat of

this site. There has also been a large increase in the population of House Crow *Corvus splendens* in the recent years, which is greatly impacting the population of many small passernines. This population growth is mainly due to the increase in human settlements and the concomitant garbage which provides a regular food supply for crows and other scavengers.

Extensive use of inorganic fertilizers and pesticides in the surrounding tea plantations might affect the avian as well as other biodiversity.

KEY CONTRIBUTORS

The IBA Team, Mrugank Prabhu, Varad Giri.

KEY REFERENCES

Biju, S.D., Bocxlaer, I.V., Mahony, S., Dinesh, K.P., Radhakrishnan, C., Zachariah, A., Giri, V. and Bossuyt, F. (2011) A taxonomic

review of the Night Frog genus *Nyctibatrachus* Boulenger, 1882 in the Western Ghats, India (Anura: Nyctibatrachidae) with description of twelve new species. *Zootaxa* 3029: 1–96.

BirdLife International (2001) *Threatened Birds of Asia: The BirdLife International Red Data Book*. BirdLife International, Cambridge, UK.

BirdLife International (2014) IUCN Red List for birds. Downloaded from <http://www.birdlife.org>.

BirdLife International (undated) *Important Bird Areas (IBAs) in Asia: Project Briefing Book*. BirdLife International, Cambridge, UK. Unpubl.

Champion, H.G. and Seth, S.K. (1968) *A Revised Survey of Forest Types of India*. Government of India Press, Delhi.

Zarri, A.A., Rahmani, A.R., and Senthilmurugan, S. (2004) Ecology of Shola Grassland. Final Report. Part A of Ecology of Shola and Alpine Grassland Project. Bombay Natural History Society, Mumbai, India. Pp. 112.

KULLUR SANDAI RESERVOIR

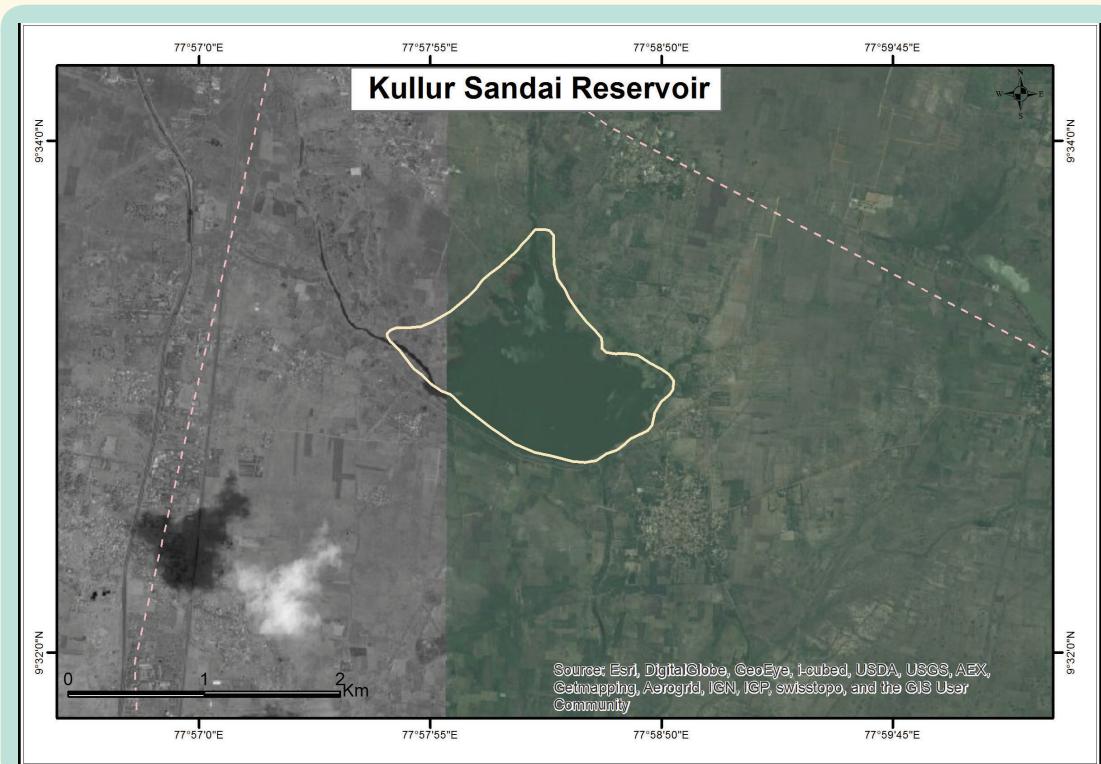
IN-TN-16

IBA Site Code	: IN-TN-16
Administrative Region (State)	: Tamil Nadu
District	: Virudhunagar
Coordinates	: 9° 33' 30" N, 78° 00' 34" E
Ownership	: Public Works Department

Area	: 1,361.5 ha
Altitude	: 80 msl
Rainfall	: 812 mm
Temperature	: 20 °C to 37 °C
Biogeographic Zone	: Deccan Peninsula
Habitats	: Freshwater Reservoir

IBA CRITERIA : A4i ($\geq 1\%$ of the biogeographic population)

PROTECTION STATUS : Non-protected Area. Reservoir established 1979.



GENERAL DESCRIPTION

The Kullur Sandai Reservoir is located in Aruppukottai taluka of Virudhunagar district, c. 8 km along the Palavanatham road. It is c. 80 km southwest of Madurai. The climate of this region is semi-arid tropical monsoon type, with high temperature and low humidity. It receives scanty rainfall, with an annual average of just 800 mm. The reservoir receives most of the rainfall during the northeast monsoon from October to December. It also receives inflow from the Khowsika river, which originates in the Western Ghats. The Vallikulam stream also flows into the reservoir during the monsoon.

Kullur Sandai Reservoir has a waterspread of 1,361 ha. The Public Works and Fisheries Departments protect the dam and undertake measures for storing water and fish

culture. Apart from Kullur Sandai, there are other irrigation reservoirs in the area (Anaikootam, Vembakkottai, and Golwarpatti). Pelicans and other birds move between these waterbodies, according to the availability of water.

The dam and its environs are rich in aquatic vegetation, with tall and medium *Borassus flabellifer* trees along the banks. The fringes have been invaded by *Ipomoea carnea*. The reservoir is fortunately free of Water Hyacinth *Eichhornia crassipes*.

AVIFAUNA

Kullur Sandai Reservoir qualifies for IBA criteria A4i, as it holds a significant number of Near Threatened Spot-billed Pelican *Pelecanus philippensis*. During the Asian Waterfowl Census in January 1987, at least 32 Spot-billed

Pelicans were recorded (Johnson *et al.* 1993). In recent years, the number of pelicans appears to have increased, as 1,670 were recorded during the pelican survey in September, 2002 (Manakadan & Kannan 2003). The 1% biogeographic population threshold of this species is 100 (Wetlands International 2012).

This IBA site also harbours several other species during winter, such as the Little Grebe *Tachybaptus ruficollis*, Eurasian Coot *Fulica atra*, Northern Shoveller *Spatula clypeata*, Gadwall *A. strepera*, Spot-billed Duck *A. poecilorhyncha*, Little Cormorant *Microcarbo niger*, Indian Cormorant *Phalacrocorax fuscicollis*, Painted Stork *Mycteria leucocephala*, Little Egret *Egretta garzetta*, and Greater Flamingo *Phoenicopterus roseus*. The total population of waterbirds sometimes exceeds 10,000.

NEAR THREATENED

Spot-billed Pelican

Pelecanus philippensis

OTHER KEY FAUNA

The Fisheries Department has almost eliminated the native fish community by the introduction of commercial species of Carp such as *Catla catla*, *Labeo rohita*, *Cirrhina mrigala*, and *Channa* spp., as well as catfish. The reservoir water is rich in phytoplankton, zooplankton, and submerged vegetation. Because of the rich growth of plankton and heavy stock of fish, pelicans and other waterfowl congregate to the reservoir. This brings them in direct conflict with the Fisheries Department.

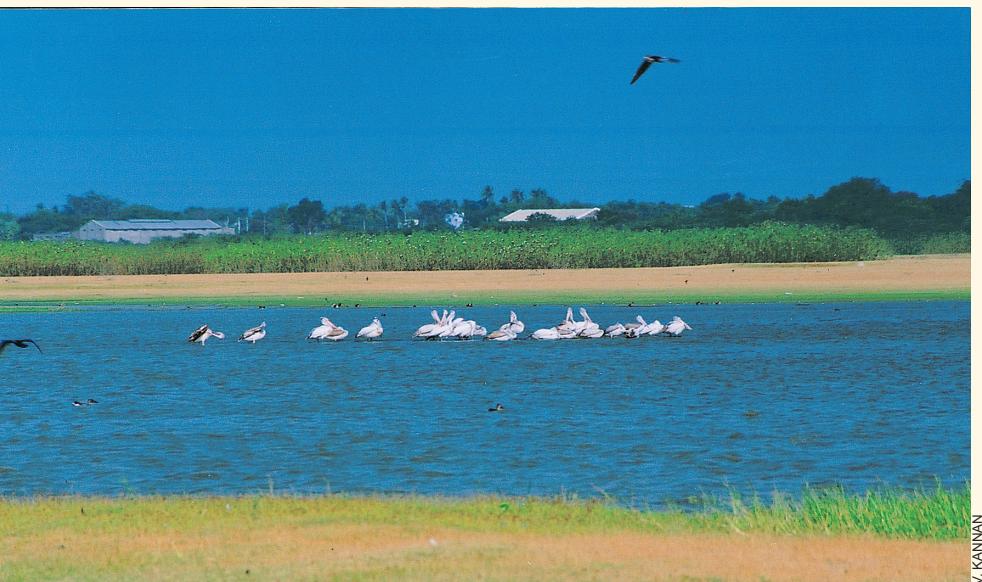
LAND USE

- Water management
- Pisciculture
- Irrigation
- Agriculture
- Grazing
- Domestic use

THREATS AND CONSERVATION ISSUES

- Land accreditation
- Influx of heavily polluted waste water
- Poaching pressure
- Discharge from cement industry

This IBA site is under great pressure from commercial fishery. According to the Fisheries Department, fish-eating



Kullur Sandai Reservoir is known for the Spot-billed Pelican

V. KANNAN

birds such as cormorants and Spot-billed Pelicans inflict heavy loss on the commercial fish culture. Their staff regularly chase away the birds, especially cormorants.

In many places, the bund has been broken due to neglect. It is in urgent need of repair and strengthening, to enable storage of more water. The weed *Ipomoea carnea* is spreading fast and, if left uncontrolled, it poses a threat to the ecology of the area.

In order to encourage nesting of pelicans, we suggest that *Barringtonia* sp. and *Acacia nilotica* trees should be planted on small artificial islands. These trees would also serve as roosting sites for other birds.

One of the biggest problems is that the Virudunagar Municipal Corporation drains polluted water and city sewage into Kullur Sandai Dam. This not only results in eutrophication, but also brings in weeds such as *Ipomoea*. Steps should be taken to minimize or divert the drainage elsewhere. In addition, appointment of forest personnel is essential to provide adequate protection to birds.

KEY CONTRIBUTOR

V. Kannan

KEY REFERENCES

Johnson, J.M., Perennou, C., and Crivelli, A. (1993) Towards the extinction of the Spot-billed Pelican (*Pelecanus philippensis*). Pp. 92–94. In: Moser, M. and Van Versem, J. (Eds) *Wetland and Waterfowl Conservation in South and West Asia*. IWRB Spec. Publ. No. 25: AWB Publ. No. 85.

Manakadan, R. and Kannan, V. (2003) A study of Spot-billed Pelican *Pelecanus philippensis* with special reference to its conservation. Final Report, Bombay Natural History Society, Mumbai.

Wetlands International (2012) *Waterbird Population Estimates, Fifth Edition*. Wetlands International Global Series No. 12. Wageningen, the Netherlands. (online version)

MUDUMALAI NATIONAL PARK

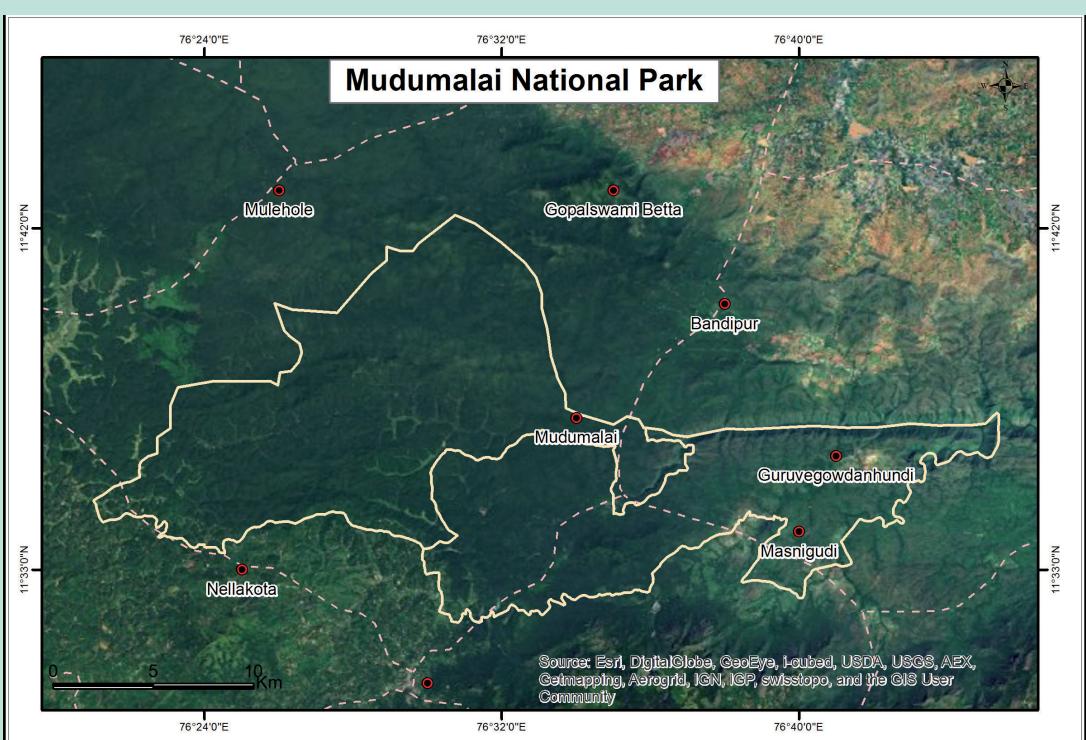
IN-TN-17

IBA Site Code	: IN-TN-17
Administrative Region (State)	: Tamil Nadu
District	: Nilgiris
Coordinates	: 11° 38' 57" N, 76° 29' 08" E
Ownership	: State
Area	: 32,100 ha

Altitude	: 690–1,400 msl
Rainfall	: 600–2,000 mm
Temperature	: 15 °C to 35 °C
Biogeographic Zone	: Western Ghats
Habitats	: Tropical Moist Deciduous Forest, Tropical Dry Deciduous Forest, Southern Tropical Thorn Forest

IBA CRITERIA : A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats),
A3 (Biome 10: Indian Peninsula Tropical Moist Forest, Biome 11: Indo-Malayan Tropical Dry Zone)

PROTECTION STATUS : National Park, established January, 1990.



GENERAL DESCRIPTION

Mudumalai National Park is located in the Nilgiri district of Tamil Nadu, in the Western Ghats. It is mainly known for its larger mammals, but also harbours rich avian diversity. The park forms 14% of the Nilgiri Biosphere Reserve, which is the first biosphere reserve of India. It is contiguous with Bandipur National Park (87,400 ha), Wynad Wildlife Sanctuary (34,400 ha), and Sigur and Singara Reserve Forests (Rodgers & Panwar 1988).

The terrain of this IBA is extremely varied, with hills, valleys, ravines, floodplains, watercourses, and swamps. Many streams drain into the area, the principal one being

Moyer, the most important source of water for the park, since most other streams dry up in early June.

Most of the serious research efforts in this IBA have so far been focused on larger mammals, their predator-prey dynamics, and elephant studies. Birds as a group have been largely ignored, except by Gokula (1998).

Mudumalai is endowed with a diversity of habitats, which support a rich variety of flora and fauna. There are three main types of forest: Tropical Moist Deciduous, Tropical Dry Deciduous, and Southern Tropical Thorn. In certain parts, mixed vegetation types are also present. Tropical Moist Deciduous Forest occurs in the western Benne block, where rainfall is higher than in the other

blocks. Tropical Dry Deciduous Forest is confined to the eastern side, but merges into Thorn Forest, where rainfall is lowest. Southern Tropical Thorn Forest, also known as scrub jungle, occurs in parts of Avarihalla, Moyar, and Bokkapuram blocks, and comprises xerophytic species (Jain & Sastry 1983). There are plantations of Teak *Tectona grandis*, largely in Benne block, and a Blue Gum *Eucalyptus globosus* plantation in the Masinagudi area. Bamboo *Bambusa* sp. has been planted mainly for supply to rayon mills in Kerala.

AVIFAUNA

A total of 266 bird species has been recorded (Gokula & Vijayan 1996). Of these, 213 are resident, 49 migrant, three local migrant, and one with unknown status. Most of the species are common and found in many other areas also, but endemics such as the Malabar Trogon *Harpactes fasciatus* and Malabar Grey Hornbill *Ocyceros griseus* are present.

Gokula & Vijayan (1996) have listed the globally Threatened Broad-tailed Grassbird *Schoenicola platyurus* as resident, without giving more details. The Vulnerable Nilgiri Wood-pigeon *Columba elphinstonii* was recorded as rare in Benne area, between May, 1994 and August, 1995.

CRITICALLY ENDANGERED

White-rumped Vulture	<i>Gyps bengalensis</i>
Long-billed Vulture	<i>Gyps indicus</i>
Red-headed Vulture	<i>Aegypius sarcogyps</i>

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

Lesser Adjutant	<i>Leptoptilos javanicus</i>
Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Yellow-throated Bulbul	<i>Pycnonotus xantholaemus</i>
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>
White-naped Tit	<i>Parus nuchalis</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Pallid Harrier	<i>Circus macrourus</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Malabar Pied Hornbill	<i>Anthracoceros coronatus</i>
Great Pied Hornbill	<i>Buceros bicornis</i>
River Tern	<i>Sterna aurantia</i>
Alexandrine Parakeet	<i>Psittacula eupatria</i>
Tytlar's Leaf-warbler	<i>Phylloscopus tytleri</i>

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Indian Rufous Babbler	<i>Turdoides subrufus</i>
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>
Small Sunbird	<i>Leptocoma minima</i>
White-bellied Treepie	<i>Dendrocitta leucogaster</i>

In the drier parts of this site, two Vulnerable species have been recorded: Yellow-throated Bulbul *Pycnonotus xantholaemus* and White-naped Tit *Parus nuchalis*. The former was seen in Mavinahalla in 1996 (BirdLife International 2014), while the latter was reported first by Ali & Whistler (1942–1943) from Sathyamangala area, close to Mudumalai, and then by K.D. Bishop (BirdLife International 2001) from the northeastern edge of Masinagudi in March, 1997.

Owing to its altitudinal, precipitation, and habitat variations, Mudumalai has two biomes: Biome 10 (Indian Peninsula Tropical Moist Forest) and Biome 11 (Indo-Malayan Tropical Dry Zone). BirdLife International (undated) has listed 15 species in Biome 10, of which 12 have been recorded in this site. Similarly, 59 species are representative of Biome 11, and in Mudumalai, 28 of these are recorded. There are not many IBAs where such a high

BIOME 10: INDIAN PENINSULA TROPICAL MOIST FOREST

Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>
Indian (Edible-nest) Swiftlet	<i>Aerodramus unicolor</i>
Malabar Trogon	<i>Harpactes fasciatus</i>
Malabar Pied Hornbill	<i>Anthracoceros coronatus</i>
White-cheeked Barbet	<i>Megalaima viridis</i>
Malabar Barbet	<i>Psilopogon malabaricus</i>
Yellow-browed Bulbul	<i>Acritillas indica</i>
Malabar Whistling-thrush	<i>Myophonus horsfieldii</i>
Dark-fronted Babbler	<i>Rhopocichla atriceps</i>
Loten's Sunbird	<i>Cinnyris lotenia</i>
Black-throated Munia	<i>Lonchura kelaarti</i>

BIOME 11: INDO-MALAYAN TROPICAL DRY ZONE

White-eyed Buzzard	<i>Butastur teesa</i>
Jungle Bush-quail	<i>Perdicula asiatica</i>
Painted Bush-quail	<i>Perdicula erythrorhyncha</i>
Indian Peafowl	<i>Pavo cristatus</i>
Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>
Indian Nightjar	<i>Caprimulgus asiaticus</i>
Indian Grey Hornbill	<i>Ocyceros birostris</i>
Yellow-crowned Woodpecker	<i>Leiopicus (Dendrocopos) mahrattensis</i>
Black-rumped Flameback	<i>Dinopium benghalense</i>
White-bellied Minivet	<i>Pericrocotus erythropygius</i>
White-naped Woodpecker	<i>Chrysocolaptes festivus</i>
Indian Lark	<i>Mirafra erythroptera</i>
Ashy-crowned Sparrow-lark	<i>Eremopterix griseus</i>
Small Minivet	<i>Pericrocotus cinnamomeus</i>
Common Woodshrike	<i>Tephrodornis pondicerianus</i>
Indian Robin	<i>Saxicoloides fulicatus</i>
Large Grey Babbler	<i>Turdoides malcolmii</i>
Jungle Babbler	<i>Turdoides striatus</i>
Yellow-billed Babbler	<i>Turdoides affinis</i>
Jungle Prinia	<i>Prinia sylvatica</i>
Ashy Prinia	<i>Prinia socialis</i>
White-browed Fantail	<i>Rhipidura aureola</i>
Grey-headed Starling	<i>Sturnus malabaricus</i>
Brahminy Starling	<i>Sturnus pagodarum</i>
White-bellied Drongo	<i>Dicrurus caerulescens</i>



V. KANNAN

Mudumalai, Bandipur National Park, Wynad Wildlife Sanctuary, and Sigur and Singara Reserve Forest together constitute one of the finest wildlife habitats of India. Besides its famous large mammals, 266 bird species have been identified in this IBA

percentage of bird species of two biomes is found. The presence of so many biome species proves that the habitat in this site is relatively pristine, at least as far as avifauna is concerned.

Mudumalai also serves as a wintering site for many migrants from the Himalaya. Some of the forest species of Biome 5 (Eurasian High Montane – Alpine and Tibetan), Biome 7 (Sino-Himalayan Temperate Forest), and Biome 8 (Sino-Himalayan Subtropical Forest) seen here are: Large-billed Leaf-warbler *Phylloscopus magnirostris*, Tickell's Warbler *Phylloscopus affinis*, and Blue-capped Rock-thrush *Monticola cinclorhynchus*.

OTHER KEY FAUNA

Mudumalai is famous for its large herds of Asiatic Elephant *Elephas maximus*, Gaur *Bos gaurus*, and Cheetal *Axis axis*. Tiger *Panthera tigris* is widespread, whereas Leopard *P. pardus* is most often seen in the Kargudi area. Other carnivores include Wild Dog *Cuon alpinus* (commonly seen in Masinagudi and Theppakkadu blocks), Striped Hyaena *Hyaena hyaena*, Golden Jackal *Canis aureus*, and Sloth Bear *Melursus ursinus*. The Asiatic Elephant population varies from 300 to 400 (Ali *et al.* 1985). Most of the ungulates, primates, and small carnivores of the

region are seen in this site. The reptile population in Mudumalai NP mainly consists of crocodiles and pythons. Common Krait *Bungarus caeruleus* and Bamboo Pit Viper *Trimeresurus gramineus* are the other major reptiles of Mudumalai.

This IBA is a part of Mudumalai Tiger Reserve, which was declared in April, 2007. Mudumalai Tiger Reserve has seasonally waterlogged grasslands, called *vayals*, spread over an area of 571.14 ha. According to Pushpakaran & Gopalan (2013), only 66% of the *vayals* are undisturbed. The *vayals* are now much fragmented due to exotic invasive species. The total area of “islands of invasive” accounts for less than 3% of the natural *vayals*. As the invasion progresses radially, more area is invaded in a short time, with the invasives suppressing the growth of native biodiversity. The area invaded by *Lantana camara* dominates, followed by *Chromolaena odorata*. Other invasives like *Mimosa pudica* and *Ageratum conyzoides* have become naturalized and are not a threat to the *vayal* ecosystem.

LAND USE

- Plantations
- Road transport

THREATS AND CONSERVATION ISSUES

- Plantations
- Hydroelectric Project
- Grazing pressure
- Forest fires
- Poaching
- Highway passing through the IBA
- Alien invasive species

The Nilgiris have undergone drastic changes in landscape, with the replacement of forests and grasslands by monoculture plantations and agriculture. Other developmental processes such as construction of dams, reservoirs, canals, and tunnels for hydroelectric projects have impacted the ecology of this area (Prabhakar & Gadgil 1994). Human settlements, with migrants brought in to support the abovementioned activities, have built up pressure on the forest to meet their livelihood needs. The impact, either direct or indirect, of anthropogenic pressure on the biota, especially birds, has not been assessed.

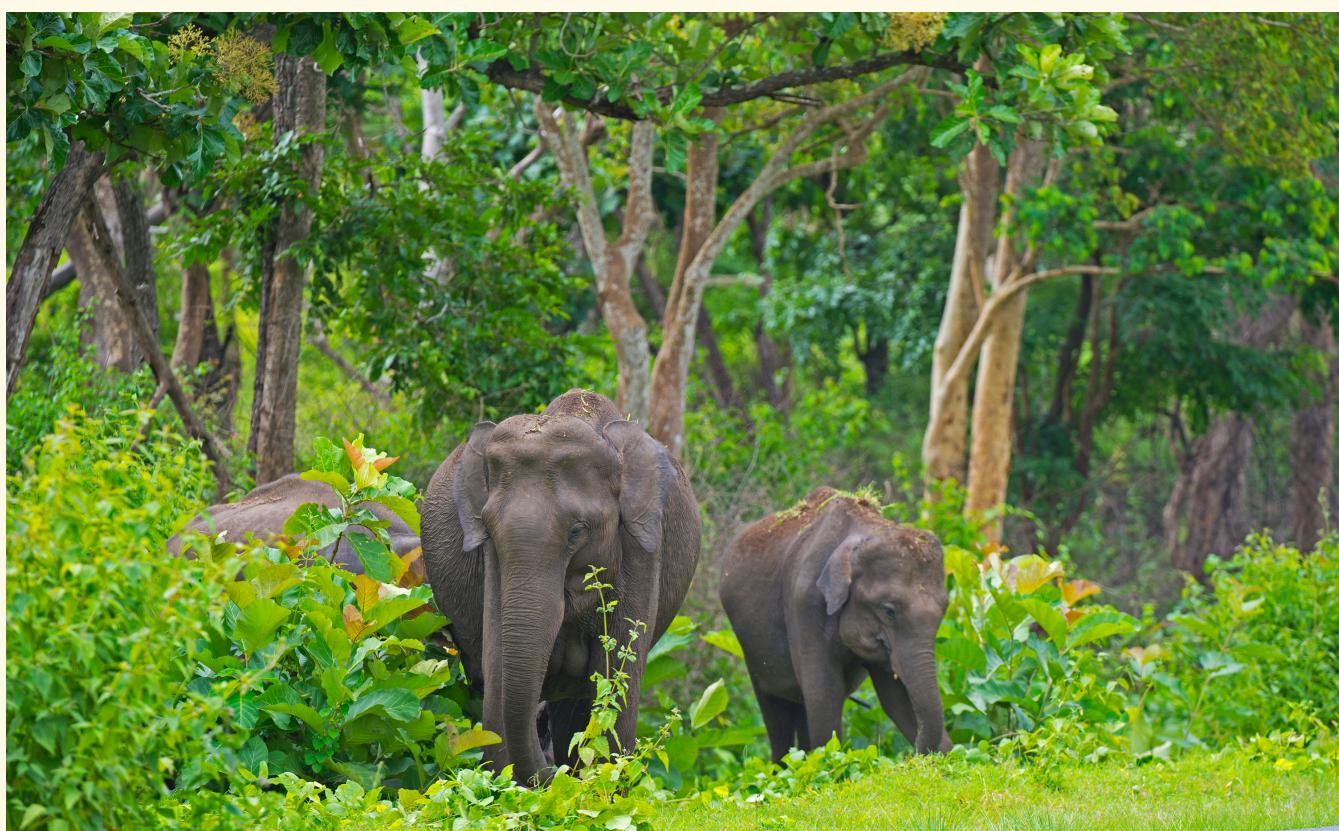
In 1985, there were 12 villages within Mudumalai WLS, occupying a total of 260 ha of *patta* land, and surrounded by Moist Deciduous and Semi-evergreen Forest (Ali *et al.* 1985). Much of the sanctuary continues to be exploited for forest produce. Some areas, especially Masinagudi and Moyar, are highly degraded by human impacts. Apart from grazing pressure, cattle also disturb elephants, compete with wildlife for pasture, and introduce diseases such as rinderpest, which

reduced the Gaur population in 1968 (Nair *et al.* 1978, Ali *et al.* 1985). According to Ali *et al.* (1985), 10,000–20,000 cattle were present in Masinagudi and Moyar areas. Timber extraction includes both selective and clear felling, and the latter damages the forest. Steps need to be taken to reduce overgrazing and the number of cattle in Mudumalai, and to voluntarily resettle residents.

Fires in the Dry Deciduous Forest considerably threaten the avifauna every year. Accumulation of dead leaves in Teak plantations helps the fire sweep through large tracts, affecting many understorey birds.

Baskaran & Boominathan (2010) recorded the road kills of vertebrate fauna at Mudumalai. They found 96 amphibian (3 species), 40 reptile (16 species), 12 bird (8 species), and 32 mammal (13 species) road kills during their 248 km transect survey, covered at the rate of 62 km/month. The reptile road kills included Russell's Viper *Daboia russelii*, Variegated Kukri Snake *Oligodon taeniatus*, John's Earth Boa *Eryx johnii*, Beaked Worm Snake *Grypotyphlops acutus*, Golden Tree Snake *Chrysopela ornata*, and Chameleon *Chamaeleo zeylanicus*. Mammals like Leopard *Panthera pardus*, Sambar *Rusa unicolor*, Cheetal *Axis axis*, and Mouse Deer *Moschiola indica* were also found among the road kills.

Mudumalai Tiger Reserve is facing threat from the rapid growth of *Lantana camara*, which has brought to the fore the havoc this invasive species is causing to the biodiversity across tropical and sub-tropical regions in India. There is



DHRTIMAN MUKHERJEE

Mudumalai is world famous for its large herds of Asiatic Elephant



DHRTIMAN MUKHERJEE

Spotted Deer or Cheetal is one of the most beautiful deer of the Indian subcontinent. Mudumalai has large herds which form the prey base of Tiger, Leopard, and Wild Dog

urgent need to monitor the impacts of this invasive species which has spread exponentially over time. Similarly, the pollution level of Moyar, the major river flowing through Mudumalai TR, from its catchment in the Nilgiris, needs to be curtailed.

KEY CONTRIBUTORS

V. Gokula, Lalitha Vijayan, Ashfaq Ahmed Zarri.

REFERENCES

Ali, S. and Whistler, H. (1942–1943) The birds of Mysore. *JBNHS* 43: 130–147, 318–341, 573–595; 44: 9–26, 206–220.

Ali, S., Daniel, J.C., Sivaganesan, B., and Desai, A.A. (1985) Study of the ecology of certain endangered species of wildlife and their habitats. The Asian Elephant. Annual Report 1984–85. Bombay Natural History Society, Bombay. Pp. 65.

Baskaran, N. and Boominathan, D. (2010) Road kill of animals by highway traffic in the tropical forests of Mudumalai Tiger Reserve, southern India. *Journal of Threatened Taxa* 2(3): 753–759.

BirdLife International (2001) *Threatened Birds of Asia: The BirdLife International Red Data Book*. BirdLife International, Cambridge, UK.

BirdLife International (undated) *Important Bird Areas (IBAs) in Asia: Project Briefing Book*. BirdLife International, Cambridge, UK. Unpubl.

BirdLife International (2014) IUCN Red List for birds. Downloaded from <http://www.birdlife.org>.

Gokula, V. (1998) Bird communities of the Thorn and Dry deciduous forests in Mudumalai Wildlife Sanctuary, South India. Ph.D. Thesis, Bharathiyar University, Coimbatore.

Gokula, V. and Vijayan, L. (1996) Birds of Mudumalai Wildlife Sanctuary, India. *Forktail* 12: 107–116.

Jain, S.K. and Sastry, A.R.K. (1983) Botany of some tiger habitats in India. Botanical Survey of India, Department of Environment, Government of India. Pp. 71.

Nair, S.S.C., Nair, P.V., Sharatchandra, H.C., and Gadgil, M. (1978) An ecological reconnaissance of the proposed Jawahar National Park. *JBNHS* 74: 401–435.

Prabhakar and Gadgil, M. (1994) Nilgiri Biosphere Reserve: Biodiversity and population growth. Pp. 33–37. In: *Survey of the Environment*. The Hindu, Kasturi Publications, Chennai.

Pushpakaran, B. and Gopalan, R. (2013) Study on the seasonally waterlogged grasslands of Mudumalai Tiger Reserve. *International Journal of Scientific and Research Publications* 3(2): 1–6.

Rodgers, W.A. and Panwar, H.S. (1988) *Planning a Wildlife Protected Area Network in India*. Vols 1 & 2. Wildlife Institute of India, Dehradun. Pp. 267, 341.

Links
<http://www.thehindu.com/sci-tech/energy-and-environment/lost-to-lantana/article5076025.ece>
<http://www.thehindu.com/sci-tech/energy-and-environment/article3708548.ece>
 As accessed on December 25, 2014

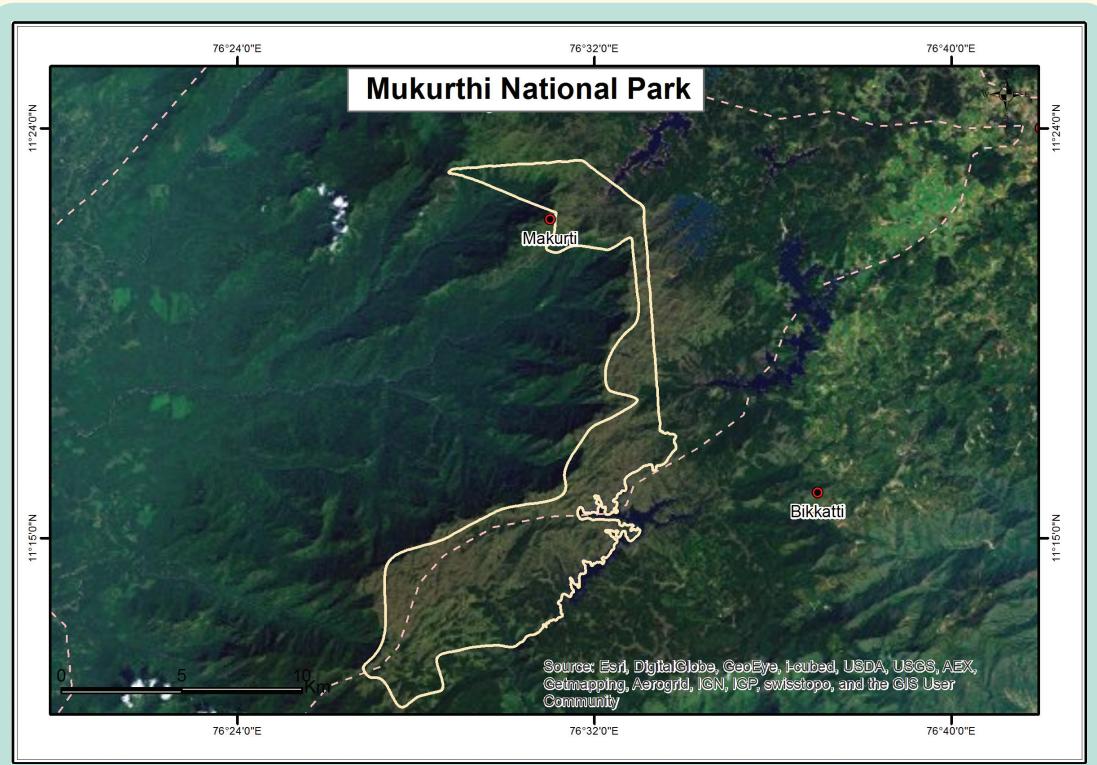
MUKURTHI NATIONAL PARK (NILGIRIS)

IBA Site Code	: IN-TN-18
Administrative Region (State)	: Tamil Nadu
District	: Nilgiris (Wildlife Division)
Coordinates	: 11° 12' 00" N, 76° 28' 11" E
Ownership	: State
Area	: 7,846 ha

Altitude	: 2,400 msl
Rainfall	: 2,500 mm
Temperature	: 11 °C to 22 °C
Biogeographic Zone	: Western Ghats
Habitats	: Tropical Grassland, Montane Wet Temperate Forest

IBA CRITERIA : A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats)

PROTECTION STATUS : Wildlife Sanctuary, declared 1980. Upgraded to National Park, October, 1990.



GENERAL DESCRIPTION

Mukurthi National Park lies on the southwestern end of the Nilgiri Hills, Tamil Nadu. It encompasses an area of 7,846 ha. The area was first declared a Wildlife Sanctuary in 1980 and later a National Park in 1990, mainly for the protection of the Endangered Nilgiri Tahr *Nilgiritragus (Hemitragus) hylocrius*. Mukurthi is perhaps the only area of the Nilgiris that has not been badly affected by conversion to exotic monoculture plantations. It is part of the Nilgiri Biosphere Reserve, which was the first to be declared among the 18 biosphere reserves present in India. Today it forms a key area for the conservation of grassland habitat in the Nilgiris.

The terrain is generally undulating, mostly grassland, and has patches of Montane Evergreen Forest (Shola),

confined to the folds and depressions. There are several streams, many of which drain into the Bhavani river. There are numerous peaks inside the national park such as Mukurthi Peak (2,556 m) and Nilgiri Peak (2,477), the highest being Kolaribetta at 2,630 m. Towards the southwest of Mukurthi lies the famous Silent Valley, and to its west the land falls steeply to nearly 2,000 m to the Amarambalam Forests. Unlike the rest of Nilgiris district, the area under monoculture plantations in Mukurthi is comparatively less, and comprises mainly *Acacia mearnsii*, *Eucalyptus globosus*, and *Pinus patula*.

The vegetation of this site can be classified into three major types, namely Southern Montane Wet Temperate Forest (Shola) as classified by Champion & Seth (1968), Grassland, and Plantation.

Pristine patches of shola forest can be seen throughout Mukurthi National Park, generally at the heads of streams in the folds of converging slopes. These forests support an amazing variety of flora and fauna. This IBA site is among the richest regions of plant biodiversity, with many endemic orchids and other plant groups. Grassland habitats in Mukurthi are common and form a mosaic with shola forest. They are a mixture of *Chrysopogon*, *Ischaemum*, *Dicanthium*, *Andropogon*, *Eragrostis*, and *Panicum* sp. The origin of these grasslands has been a subject of debate.

AVIFAUNA

Mukurthi is an important area for the conservation of the biodiversity of this region, including many avian species of special conservation interest, notably the Endangered Black-chinned (Nilgiri) Laughingthrush *Strophocincla cachinnans*. It also supports many globally Threatened and endemic species.

Around 120 bird species have been recorded from Mukurthi National Park and adjoining forests (Zarri *et al.* 2009). Of these, the Black-chinned Laughingthrush, Nilgiri Wood-pigeon *Columba elphinstonii*, Nilgiri Pipit *Anthus nilghiriensis*, and Nilgiri Blue Robin *Myiomela major* are globally Threatened. The grasslands in Mukurthi are vital for the conservation of restricted-range species such as the Nilgiri Pipit *Anthus nilghiriensis* and wintering raptors

such as Oriental Honey-buzzard *Pernis ptilorhynchus*, White-eyed Buzzard *Butastur teesa*, Long-legged Buzzard *Buteo rufinus*, Common Buzzard *Buteo buteo*, Crested Serpent-eagle *Spilornis cheela*, Short-toed Snake Eagle *Circaetus gallicus*, and Eastern Imperial Eagle *Aquila heliaca*.

Mukurthi National Park lies in the Western Ghats Endemic Bird Area (EBA 123), where Stattersfield *et al.* (1998) had listed 16 restricted-range species. After taxonomic changes, we now have 26 endemic species in the Western Ghats (Rasmussen & Anderton 2005, 2012; del Hoyo & Collar 2014). Of these, 11 species have been reported till now.

This IBA is located in Biome 10 which comprises Indian Peninsula Tropical Moist Forest (BirdLife International undated). Fifteen species represent this biome. Some of the Biome 10 species found in the IBA are White-cheeked Barbet *Megalaima viridis*, Indian Scimitar-babbler *Pomatorhinus horsfieldii*, and Malabar Whistling-thrush *Myophonus horsfieldii*. The Indian Scimitar-babbler is widely distributed, so it may not be the best example of this biome.

The forests and grasslands of Mukurthi are important wintering areas for many birds that are listed in other biomes, such as Tickell's Leaf Warbler *Phylloscopus affinis*, Large-billed Leaf-Warbler *Phylloscopus magnirostris*,



A.J.T. JOHNsingh

Mukurthi NP was mainly created for the protection of Nilgiri Tahr *Nilgiritragus (Hemitragus) hylocrius*.
This small national park has extensive shola grassland

ENDANGERED	
Egyptian Vulture	<i>Neophron percnopterus</i>
Black-chinned Laughingthrush	<i>Strophocincla cachinnans</i>
Nilgiri Blue Robin	<i>Myiomela major</i>
VULNERABLE	
Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Eastern Imperial Eagle	<i>Aquila heliaca</i>
Wood Snipe	<i>Gallinago nemoricola</i>
Kashmir Flycatcher	<i>Ficedula subrubra</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
NEAR THREATENED	
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>
Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Pallid Harrier	<i>Circus macrourus</i>
ENDEMIC BIRD AREA 123: WESTERN GHATS	
Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Malabar Parakeet	<i>Psittacula columbooides</i>
Malabar Barbet	<i>Psilopogon malabaricus</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Nilgiri Blue Robin	<i>Myiomela major</i>
Black-chinned Laughingthrush	<i>Strophocincla cachinnans</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>
Small Sunbird	<i>Leptocoma minima</i>
BIOME 10: INDIAN PENINSULA TROPICAL MOIST FOREST	
White-cheeked Barbet	<i>Megalaima viridis</i>
Malabar Barbet	<i>Psilopogon malabaricus</i>
Yellow-browed Bulbul	<i>Acritillas indica</i>
Malabar Whistling-thrush	<i>Myophonus horsfieldii</i>
Indian Scimitar-babbler	<i>Pomatorhinus horsfieldii</i>

Brown-breasted Flycatcher *Muscicapa muttui*, Blue-headed Rock-Thrush *Monticola cinclorhynchus*, and Indian Blue Robin *Luscinia brunnea*. Interestingly, six species listed in Biome 11 (Indo-Malayan Tropical Dry Zone) by BirdLife International (undated) have been found here. All the six are common and widely distributed, and thus of not much conservation concern.

This excellent national park fits three IBA criteria: A1: it has the globally Threatened and highly endemic Nilgiri or Black-chinned Laughingthrush; A2: it has 11 restricted-range species and falls in the Western Ghats Endemic Bird Area 123; and A3: it has biome-restricted species.

Zarri *et al.* (2009) did not record any of the Critically Endangered Gyps vultures during the survey period. Nearly 125 years ago, Davison (1883) stated that the White-rumped Vulture is abundant in the Nilgiris. The Red-headed Vulture *Aegypius calvus* was also once common here.

OTHER KEY FAUNA

Besides birds, the grassland habitat in this IBA is home to a wide variety of orchids, balsam and other associated

herbs. Also reported are Threatened and endemic species of tree frogs, pit vipers, and mammals, such as the Nilgiri Marten *Martes gwatkinsii*.

The flagship mammal of this park is the Nilgiri Tahr *Nilgiritragus hylocrius* that once inhabited the slopes and cliffs in huge herds. Today, this species is rarely seen, except for one or two herds in the Western Catchment Area.

Other fauna of the site include Nilgiri Langur *Trachypithecus johni*, often seen in large troops or heard hooting. Sightings of Tiger *Panthera tigris* and Leopard *P. pardus* are frequent. These large predators have adapted very well to hunting across vast stretches of grassy hills. Packs of Wild Dog *Cuon alpinus*, sometimes up to 25, are commonly seen. Sighting of Nilgiri Marten *Martes gwatkinsi*, is rare, perhaps because of its elusive nature. Sambar *Rusa unicolor* and Barking Deer *Muntiacus muntjak* are quite common, and form the main prey for large cats. Asiatic Elephant *Elephas maximus* can be seen crossing the park in small herds during the monsoon on their annual migration to the northern plains.

A host of smaller mammals including Jungle Cat *Felis chaus*, Small Indian Civet *Viverricula indica*, Brown Palm Civet *Paradoxurus jerdoni*, Stripe-necked Mongoose *Herpestes vitticollis*, Common Mongoose *Herpestes edwardsi*, Golden Jackal *Canis aureus*, and Indian Wild Boar *Sus scrofa* are reported (Zarri *et al.* 2002).

LAND USE

- Nature conservation

THREATS AND CONSERVATION ISSUES

- Burning of grassland
- Grassland invasion by *Cytisus scoparius* and *Ulex europia*
- Construction of dykes, dams and barrages.

Mukurthi has undergone relatively few habitat changes, but there has been some replacement of forests and grasslands by monoculture plantations and agriculture. Developmental processes such as construction of dams, reservoirs and tunnels under a major hydroelectric project have, however, affected the ecology of this IBA severely in the past.

Mukurthi National Park is free from anthropogenic pressure as experienced in other sites. However, in view of its growing popularity as a prominent tourist destination, unregulated tourism is likely to become a threat to the conservation of this wilderness.

The spread of the alien invasive shrub Scotch Broom *Cytisus scoparius* has emerged as a major problem for the grassland of Mukurthi National Park and surrounding areas. The shrub has invaded the grassland rapidly, and wherever established it has completely wiped



DHRTIMAN MUKHERJEE

Nilgiri Pipit *Anthus nilghiriensis* is endemic to the southern Western Ghats and found mainly in high altitude grasslands. It is now considered Vulnerable by IUCN

out the indigenous grasses. This in turn affects the associated flora and fauna specific to these grasslands, such as the Nilgiri Pipit and other ground-dwelling birds.

The patches of wattle plantation are a problem for the site, owing to their natural capacity for regeneration through seeding.

Intentional burning of the grassland during the peak dry season by people on the Kerala side of the Park has emerged as a serious threat to the grassland dwelling species. The grasslands are burnt to lure Sambar for illegal hunting on the Park's southern and southwestern borders. Between January and June 2003, there were five major fires to the south of Bangitapal Valley, which affected 25–35% of the grassland in the Park. The first three major fires in Nadukani and nearby grasslands coincided with the breeding season of the Nilgiri Pipit.

Besides the direct impacts of grassland burning on birds, the opening created by fire provides suitable sites for the germination of Scotch Broom, which is a potential ecological disaster for this IBA.

KEY CONTRIBUTORS

Ashfaq Ahmed Zarri, Asad R. Rahmani.

KEY REFERENCES

BirdLife International (undated) *Important Bird Areas (IBAs) in*

Asia: Project Briefing Book. BirdLife International, Cambridge, UK. Unpubl.

Champion, H.G. and Seth, S.K. (1968) *A Revised Survey of the Forest Types of India*. Govt. of India Press, Nasik. Pp. 404.

Davison, W. (1883) Notes on some birds collected on the Nilgiris and parts of Wynnaad and southern Mysore. *Stray Feathers* 10(5): 329–419.

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Vol. 1: Non-passerines. Lynx Edicions, Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington D.C. and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2, 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University, and Lynx Edicions, Washington, D.C., Michigan, and Barcelona.

Stattersfield, A.J., Crosby, M.J., Long, A.J., and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK. Pp. 846.

Zarri, A.A., Rahmani, A.R., and Senthilmurugan, S. (2002) *Ecology of Shola and Alpine Grasslands*. Annual Report. 2 Part 1. Bombay Natural History Society, Mumbai.

Zarri, A.A., Rahmani, A.R., and Senthilmurugan, B. (2009) Birds of the Upper Nilgiris plateau, Western Ghats, India. *JBNHS* 105:(2): 181–195.

NADUVATTAM FOREST RANGE (NILGIRIS)

IBA Site Code	: IN-TN-19
Administrative Region (State)	: Tamil Nadu
District	: Nilgiris (South Division)
Coordinates	: 11° 19' 00" N, 76° 34' 00" E
Ownership	: State
Area	: c. 3,538 ha

Altitude	: 1,500 msl
Rainfall	: Not available
Temperature	: Not available
Biogeographic Zone	: Western Ghats
Habitats	: Montane Wet Temperate Forest (Shola), Tropical Secondary Scrub

IBA CRITERIA : A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats).

PROTECTION STATUS : Not officially protected.

MAP NOT AVAILABLE

GENERAL DESCRIPTION

Naduvattam is a forest range under the jurisdiction of the South Division of Nilgiris district. It comprises two areas, namely Mudimunth (1,346 ha) and Naduvattam (2,192 ha). The areas have several pockets of Shola forest and exotic plantation. This site is located between Mudumalai and Ooty.

AVIFAUNA

Not much study has been done, but Loven Pereira (*pers. comm.* 2003) has seen more than 40 species, including some Western Ghats endemics. The site lies in the Western Ghats Endemic Bird Area (EBA 123), where Stattersfield *et al.* (1998) have listed 16 restricted-range species. Based on recent taxonomic changes (Rasmussen & Anderton 2005, 2012; del Hoyo & Collar 2014), 26 bird species are now considered endemic to the Western Ghats. Ten of these are found in this IBA, which proves that some shola habitat is still available, despite extensive plantation of exotics in the past.

The Vulnerable and restricted-range species of Western Himalaya, the Kashmir Flycatcher *Ficedula subruba* is also recorded from this IBA (Zarri *et al.* 2009).

Naduvattam is located in Biome 10 (BirdLife International undated). Fifteen species represent this biome, out of which five are reported from this IBA. There is an old record of Lesser Florican *Sypheotides indicus* from this site; Davison (1883) quotes A.O. Hume, “A specimen was killed on the slopes to the Nilgiris some years ago between Naduvattam and Pykara, going down to the Wynnaad.” This is one of the most important historical records for Naduvattam.

OTHER KEY FAUNA

Not much information is available.

LAND USE

- Forestry
- Plantation

ENDANGERED

Black-chinned (Nilgiri)	<i>Strophocincla cachinnans</i>
Laughingthrush	
Nilgiri Pipit	<i>Anthus nilghiriensis</i>

VULNERABLE

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Nilgiri Blue Robin	<i>Myiomela major</i>
Kashmir Flycatcher	<i>Ficedula subruba</i>

NEAR THREATENED

Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>

ENDEMIC BIRD AREAS: 123: WESTERN GHATS

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Malabar Parakeet	<i>Psittacula columbooides</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Nilgiri Blue Robin	<i>Myiomela major</i>
Black-chinned Laughingthrush	<i>Strophocincla cachinnans</i>
Black-and-orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>
Small Sunbird	<i>Leptocoma minima</i>

BIOME 10: INDIAN PENINSULA TROPICAL MOIST FOREST

White-cheeked Barbet	<i>Megalaima viridis</i>
Malabar Barbet	<i>Psilopogon malabaricus</i>
Yellow-browed Bulbul	<i>Acritillas indica</i>
Malabar Whistling-thrush	<i>Myophonus horsfieldii</i>
Indian Scimitar-babbler	<i>Pomatorhinus horsfieldii</i>

THREATS AND CONSERVATION ISSUES

The IBA is quite well protected. No one is allowed entry without a permit. A Cinchona plantation has been converted into a tea plantation by the Government of Tamil Nadu. Commercialization of native vegetation types (mainly grassland) has, however, severely affected the ecology of this area.



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VINAYAK ARDI

Kashmir Flycatcher *Ficedula subrufa*, a Vulnerable species, is seen wintering in this IBA

KEY CONTRIBUTORS

Loven Pereira, Ashfaq Ahmed Zarri.

KEY REFERENCES

BirdLife International (undated) *Important Bird Areas (IBAs) in Asia: Project Briefing Book*. BirdLife International, Cambridge, UK. Unpubl.

Davison, W. (1883) Notes on some birds collected on the Nilgiris and parts of Wynnaad and southern Mysore. *Stray Feathers* 10(5): 329–419.

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Vol. 1: Non-passerines. Lynx Edicions, Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: the Ripley guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington, D.C. and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2, 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University, and Lynx Edicions, Washington D.C., Michigan, & Barcelona.

Stattersfield, A.J., Crosby, M.J., Long, A.J., and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK. Pp. 846.

Zarri, A.A., Rahmani, A.R., and Senthilmurugan, B. (2009) Birds of the Upper Nilgiris plateau, Western Ghats, India. *JBNHS* 105(2): 181–195.

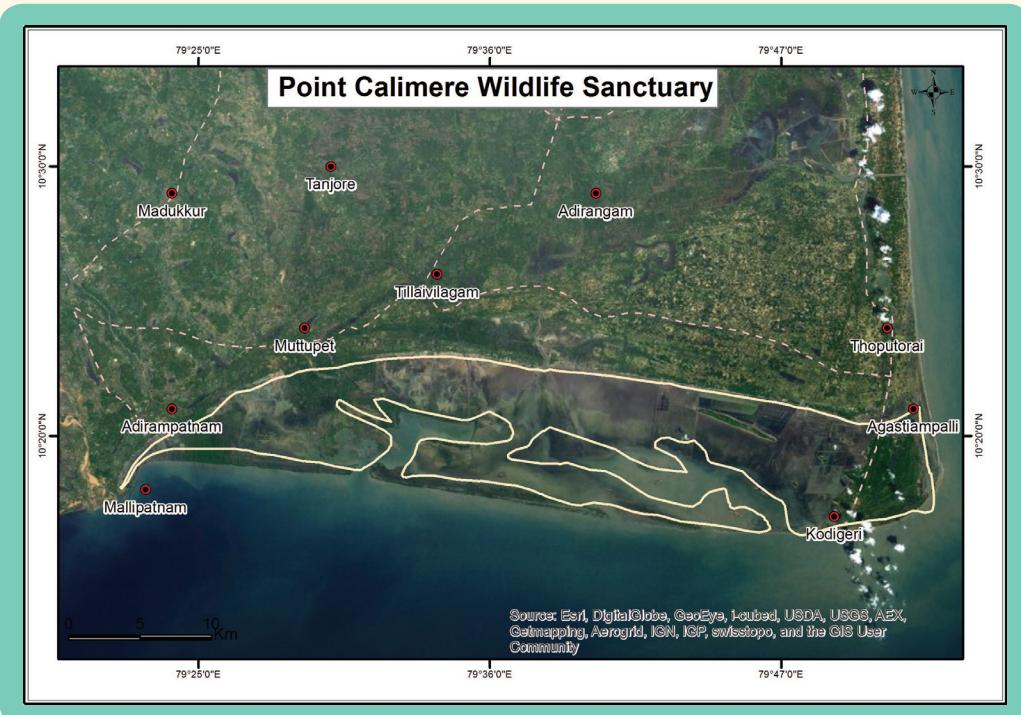
POINT CALIMERE WILDLIFE AND BIRD SANCTUARY

IBA Site Code	: IN-TN-20
Administrative Region (State)	: Tamil Nadu
District	: Nagapattinam
Coordinates	: 10° 18' 00" N, 79° 50' 60" E
Ownership	: State
Area	: 37,733 ha

Altitude	: 0–3 msl
Rainfall	: 472–1,153 mm
Temperature	: 21–41 °C
Biogeographic Zone	: Coasts
Habitats	: Tropical Dry Evergreen Forest, Littoral Forest

IBA CRITERIA: A1 (Threatened species), A4i ($\geq 1\%$ biogeographic population threshold), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS: Wildlife Sanctuary, established June, 1967.



GENERAL DESCRIPTION

Point Calimere Wildlife and Bird Sanctuary is situated on a low promontory on the Coromandel coast in Nagapattinam district. The Great Vedaranyam Swamp stretches for about 48 km from east to west, parallel to the Palk Strait and separated from it by a sand bank. Its dimensions are c. 10 km from north to south; it is broadest in the east, narrowing to c. 8 km in the central part and 6 km in the western end. It is c. 11 km from Vedaranyam town. There are only two villages, namely Kodikkarai and Kodikkadu. A motorable road connects the sanctuary with the nearest town.

The control of the area passed from the Revenue Department to the Forest Department in 1907. The forest of Point Calimere Sanctuary has an area of 1,729 ha, comprising Kodikkadu Reserve Forest and Kodikkadu

Extension Reserve Forest. During 1988, it was declared Point Calimere Sanctuary as Point Calimere Wildlife and Bird Sanctuary, with a total area of 37,733 ha, including the Great Vedaranyam Swamp and Talaignayar Reserve.

The IBA includes a mangrove forest and lagoon in Muthupet-Adirampattinam, and mudflats interspersed with numerous islets in the Siruthalaikkadu-Kodikkarai area. The IBA also encompasses a Tropical Dry Evergreen Forest and low-lying coastal grazing lands. Five freshwater channels empty into the Swamp, most of which have running water only during the monsoon. The Korayar river confluences with the Mullipallam lagoon in the west. The Swamp is demarcated to the north by an artificial bund, where there is a 30 m wide belt of mangrove vegetation. The area has variable rainfall regimes, and is not typical of the tropical monsoon climate.

CRITICALLY ENDANGERED	
Spoon-billed Sandpiper	<i>Eurynorhynchus pygmeus</i>
ENDANGERED	
Spotted Greenshank	<i>Tringa guttifer</i>
VULNERABLE	
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>
NEAR THREATENED	
Spot-billed Pelican	<i>Pelecanus philippensis</i>
Lesser Flamingo	<i>Phoeniconaias minor</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Pallid Harrier	<i>Circus macrourus</i>
Black-tailed Godwit	<i>Limosa limosa</i>
Eurasian Curlew	<i>Numenius arquata</i>

The northeast monsoon is the main contributor to this area, though some rainfall occurs during the southwest monsoon. The winds are dry, but cause low-pressure depressions in the Bay of Bengal, resulting in cyclonic storms on the mainland (Daniel & Rao 1988–1991).

Point Calimere Wildlife and Bird Sanctuary was declared as a Ramsar Site on August 29, 2002 and has been designated as Ramsar Site No. 1210. This IBA and Ramsar site qualifies for Ramsar Criteria 2 (wetland supports threatened ecological communities), Criteria 4 (wetland provides refuge during adverse conditions to threatened species), Criteria 5 (wetland regularly supports 20,000 or more waterbirds), Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies). The site is Ramsar wetland type of this site is H (Intertidal marshes) and J (Coastal brackish/saline lagoon) (Islam & Rahmani 2008).

AVIFAUNA

This IBA is an extremely important staging and wintering ground for migratory birds. Remarkable among them are flamingos, ducks, waders, gulls and terns. It is also a vital foraging ground for several species. It harbours a large number of migratory waders and flamingos (Ali 1963). A total of 110 species of waterbirds has been recorded from the swamp and saltpans. Of these, 34 are winter migrants from the Palearctic region (Sugathan 1982). According to a census in January 1987, 28,000 Greater Flamingo *Phoenicopterus roseus* and 100,000 Garganey *Querquedula querquedula* were recorded. The Near Threatened Spot-billed Pelican *Pelecanus philippensis* also occurs here. Manakadan (1992) had recorded 150–250 birds yearly in the late 1980s in the Great Vedaranyam Swamp during regular bird census. About 1,200 pelicans were recorded in the Great Vedaranyam Swamp during October, 1999 (S. Balachandran *pers. comm.* 2002).

Between January and March 1983, four Spoon-billed Sandpiper *Eurynorhynchus pygmeus* were ringed here (Sugathan 1985). A total of 11 individuals were ringed during 1980s and 1990s by BNHS. One individual was seen on February 1, and two on February 4, 1994 by Alan Lewis (Anon. 1994) and another by P. Heath on December 11, 1995 (*OBC Bulletin 23: 50*, 1996).

About 25 years ago, nearly a million birds used to congregate at Point Calimere, including 50,000 flamingos. In 2009, a census recorded 95,000 birds, including 6,000 flamingos (S. Balachandran, *pers. comm.* 2014).

Earlier, Manakadan (1992) recorded 54 waterbird species in the Great Vedaranyam Swamp. Ramsar Site Report (2002) indicated that 119 waterbirds and 138 land birds visit the Point Calimere Wildlife and Bird Sanctuary. Baruah (2005) compiled a list of 269 species of birds in the sanctuary, of which 103 species were migratory waterbirds.

Hussain (1976) recorded Indian Broad-tailed Grass-warbler or Grassbird *Schoenicola platyurus*, a globally Vulnerable species.

Many species of ducks and waders occur in site in much above their 1% biogeographical number, as determined by Wetlands International (2012).

OTHER KEY FAUNA

Major mammals include Blackbuck *Antilope cervicapra*, Spotted Deer or Cheetal *Axis axis*, Jackal *Canis aureus*, Wild Boar *Sus scrofa*, and Black-naped Hare *Lepus nigricollis*. Large numbers of feral cattle and feral horses are seen in the Kodikkadu forests. Blackbuck is the star attraction of the sanctuary for which large numbers of tourists come to this area.

Olive Ridley Turtle *Lepidochelys olivacea* have been regularly nesting in the sanctuary beach. During winter, Dolphin sighting is common along the sanctuary coast, between October and March.

LAND USE

- Agriculture
- Fishing
- Livestock grazing
- Medicinal plant collection
- Research and conservation

CONSERVATION ISSUES

- Encroachment
- Poaching
- Cattle grazing
- Collection of firewood
- Industrialization in Great Vedaranyam Swamp

The Bombay Natural History Society has established Bird Migration Study Centre in Point Calimere. This centre is creating awareness among the local fisherfolk

community as well as local citizens. The centre also conducts studies on bird migration, bird identification, and ringing training programmes for scientists. It has created employment opportunities for local bird trappers, thus converting them from hunters to conservationists. The centre has also resulted in increased tourism, helping to increase revenue in the area.

The entire swamp and the adjoining Muthupet mangrove area should be declared as a single National Park. No major industries should be allowed within the prescribed limits as per the Wildlife (Protection) Act, 1972. Existing industries should treat their effluents and should have separate effluent storage tanks.

Studies should be taken up on the autecology of the important medicinal plants occurring in the forest, to preserve this invaluable gene pool. Freshwater inflow should be allowed into the swamp; this would help to provide a healthier habitat for migratory waterbirds. To reduce overgrazing of cattle in the sanctuary, unregistered animals should be removed from the area. Tilling, ploughing, and plantation operations should be banned in the open grazing land, as they affect the Blackbuck population.

On December 26, 2004 a tsunami as high as 3 metres hit the Kadiyakarai coast of the sanctuary. Seawater flooded the entire sanctuary with 1.25 m of water. Fortunately, the sanctuary escaped serious damage and the animals and birds largely survived the giant wave. But 5,525 people were killed in neighbouring parts of Nagapattinam district (Sivasubramanian & Sivakkumar 2005).

KEY CONTRIBUTORS

V. Kannan, Ranjit Manakadan, and S. Balachandran.

KEY REFERENCES

Ali, S. (1963) Point Calimere as a refuge for wintering shorebirds. *JBNHS* 60, 458–460.
 Anon. (1994) From the field. *OBC Bulletin* 19: 66.
 Baruah, A.D. (2005) *Point Calimere Wildlife and Bird Sanctuary*. Tamil Nadu Forest Department Publication, Nagapattinam.
 Daniel, J.C. and Rao, Y.N. (1988–1991) Ecology of Point Calimere



S. BALACHANDRAN

The salt pans and mudflats of Point Calimere attract thousands of waders.

Here, repair of a salt pan bund is going on

Wildlife and Bird Sanctuary (An Endangered ecosystem). Final report. Bombay Natural History Society, Bombay.
 Hussian, S.A. (1976) Occurrence of the Broadtailed Grass Warbler [*Schoenicola platyura* (Jerdon)] on the Coromandel coast. *JBNHS* 73: 400–401.
 Islam, M.Z. and Rahmani, A.R. (2008) *Potential and Existing Ramsar Sites in India*. Indian Bird Conservation Network: Bombay Natural History Society, BirdLife International and Royal Society for the Protection of Birds. Oxford University Press, New Delhi. Pp. 592.
 Manakadan, R. (1992) Ecology of waterbirds of Point Calimere Wildlife Sanctuary with special reference to impact of salt works. Ph.D. Thesis. Bombay University, Bombay.
 Ramsar Site Report (2002) Information sheet on Ramsar Wetlands (RIS) Categories approved by recommendations 4.7 of the Conference of the Contracting Parties. Extracted from <http://www.wetlands.org/reports/ris/2IN01en.pdf>. Accessed on March 14, 2015.
 Sivasubramanian, C. and Sivakkumar, R. (2005) Study of the Impact of the Tsunami on the Point Calimere Wildlife and Bird Sanctuary and the Muthupet Mangrove Forest. *Conservation Action Series* (Department of Zoology, North Orissa University: Wildlife Trust of India) (20050904): 66–71.
 Sugathan, R. (1982) Some interesting aspects of the avifauna of Point Calimere, Thanjavur district, Tamil Nadu, *JBNHS* 79: 567–575.
 Sugathan, R. (1985) Observations on Spoon-billed Sandpiper (*Eurynorhynchus pygmeus*) in its wintering ground at Point Calimere, Thanjavur district, Tamil Nadu. *JBNHS* 82: 407–408.
 Wetlands International (2012) *Waterbird Population Estimates: Fifth Edition*. Wageningen, The Netherlands. (online version).

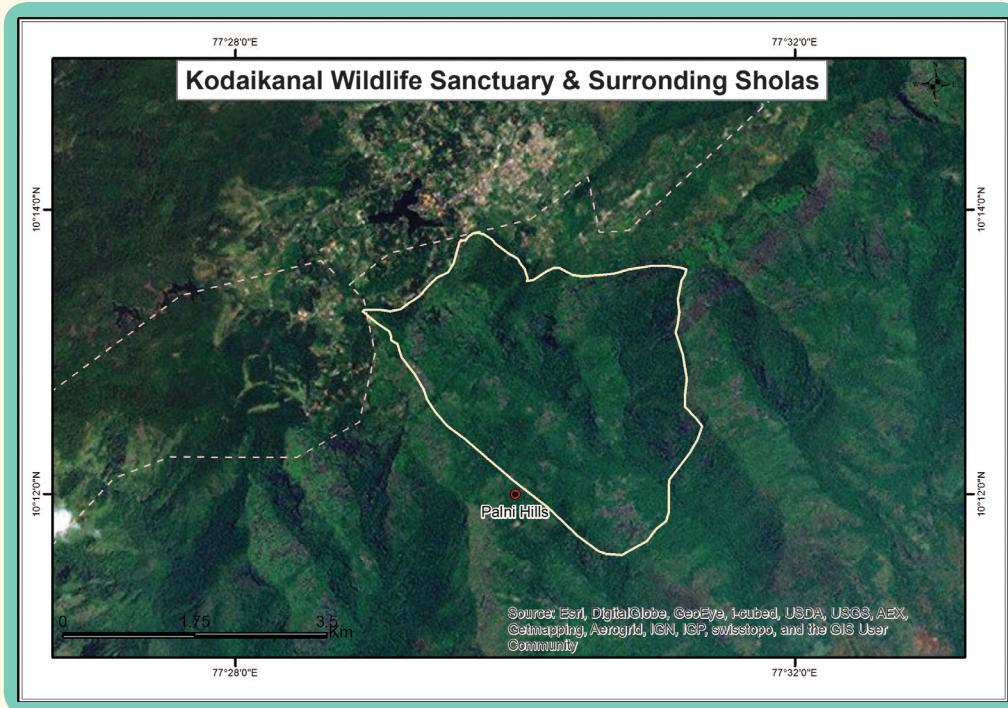
KODAIKANAL WILDLIFE SANCTUARY & SURROUNDING SHOLAS

IN-TN-22

IBA Site Code	: IN-TN-22 (IN-TN-21 Poomparai and Kukkal merged in this IBA)	Area	: 60,895 ha
Administrative Region	: Tamil Nadu	Altitude	: 1,500–2,700 msl
(State)		Rainfall	: 160–180 mm
District	: Dindigul	Temperature	: 4 °C to 23 °C
Coordinates	: 10° 13' 06" N, 77° 34' 29" E	Biogeographic Zone	: Western Ghats
Ownership	: State	Habitats	: Montane Wet Temperate Forest, Tropical Dry Evergreen Forest, Tropical Grassland

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats)

PROTECTION STATUS: The sholas now fall within the Kodaikanal Wildlife Sanctuary, declared 2013.



GENERAL DESCRIPTION

Bear Shola, Tiger Shola, Pampar Shola, Vattakanal Shola, Peumalmalai Shola, and Blackburn Shola of Palni Hills are located in and around Kodaikanal WLS. Bombay Shola is located on the edge of Kodaikanal, while Vattakanal is 6 km outside it. In Bombay Shola, the ground cover is meagre due to heavy exploitation. The montane quasi-temperate climate of Kodaikanal plateau is maintained due to the presence of these sholas and the century-old Pine and Wattle plantations. Among these sholas, Pampar and Vattakanal sholas are probably the best preserved. Vattakanal Shola contains six extremely rare and endangered tree species and numerous terrestrial orchids. These sholas are home to many endemic species of plants, amphibians, butterflies,

and birds (S. Balachandran, *pers. comm.* 2002). The plateau bears grasslands alternating with wooded shola forest.

Many endemic and endangered plant species have been reported from Pampar and Vattakanal. About 75% of the plateaus originally had grassland. The grasslands are famous for *Strobilanthes kunthianus*, which blossoms once in 12 years. The occurrence of the Endangered *Bentinckia condopanna* at Pampar Shola is noteworthy. Pampar Shola has some very rare species such as *Sonerila pulneyensis*, *Hoya wightii palnensis*, *Plectranthus bourneae*, *Tichoglottis tenera*, and *Phyllanthus chandrabosei*.

Of the two great valleys, Vilpatti and Poomparai, on the north of the Kodaikanal plateau, the Poomparai Valley is the most striking, with almost parallel sides cultivated

and ascending through woodland, broken ground and precipitous crags. Poomparai village is situated 20 km west of Kodaikanal. The forests around Poomparai are pre-dominantly Evergreen Shrub, degraded Shola, and old plantations of Wattle, Pine and Blue Gum. Poomparai village is surrounded by cultivated land. Natural forest is restricted to isolated pockets (altitude 1,890 m) at Poomparai. Kukkal lies 6 km northwest of Poomparai and adjacent habitats are Semi-Evergreen and Evergreen Forests, and Shola Grassland. The largest contiguous stretch of shola of the Upper Palnis is situated here. A check dam had been constructed along the stream to retain water for cultivation. An old mud road which deviated from the Poomparai-Mannavanur road to Kukkal was converted into a tar road and a public transport service was introduced in the late 1990s.

This undulating plateau bears grasslands interspersed with wooded sholas. The grasslands have been extensively planted with Wattle, Eucalyptus, Pine, and *Alnus*. Common endemic plant species occurring around Poomparai are *Michelia nilagirica* and *Symplocos cochinchinensis*. The rare endemic plants of Kukkal Shola are *Litsea floribunda*, *Habenaria pallideviridis*, *Viburnum erubescens*, and a solitary population of *Cycas circinalis* (Mathew 1999).

In 2013, the Government of Tamil Nadu agreed to declare the Kodaikanal Wildlife Sanctuary under section

26 A1(b) of the Wildlife (Protection) Act, 1972 (Central Act 53 of 1972). The total area of the sanctuary is 608.95 sq. km in three *talukas* (Kodaikanal, Palani and Periyakulam) and it falls mainly in Dindugul district and partly in Theni district.

AVIFAUNA

The BNHS has conducted bird ringing here since 1970, and 94 species of birds have been identified from this IBA (Balachandran *et al.* 2003). Almost all the high altitude endemics of the Western Ghats have been seen in these sholas. Interestingly, the Vulnerable and endemic Nilgiri Wood-pigeon *Columba elphinstonii*, which was rare during the 1980s, has now become quite common, and found to breed in these shola patches. No decline has been observed in other endemic species, including White-bellied Blue Robin *Myiomela albiventris* and Nilgiri Flycatcher *Eumyias albicaudatus*, which is evident from their common occurrence in the gardens and campuses of Kodaikanal town. From BNHS ringing data of the last 30 years, it was found that the Black-and-Orange Flycatcher *Ficedula nigrorufa* and White-bellied Blue Robin *Myiomela albiventris* from neighbouring forest patches (Poombarai) have shown a steady increase in the total bird catch since the 1970s (Balachandran *pers comm.* 2003). One White-bellied Blue Robin was recaptured after 13 years. However, the Nilgiri Pipit *Anthus nilghiriensis* has decreased, mainly due to the plantation of exotic trees in shola grasslands. (Balachandran *et al.* 2003). Indian Rufous Babbler *Turdoides subrufus*, the mid-altitude endemic, was reported for the first time from this site at an altitude of 1,900 m.

Recent taxonomic changes (del Hoyo & Collar 2014) show that 26 restricted-range or endemic species are now found in the Western Ghats. Based on the work done by Balachandran *et al.* (2003) in the early 2000s, 17 of them have been reported from this IBA site.

Tremendous changes in the bird community structure have been noticed in some sholas of Kodaikanal Wildlife Sanctuary. For example, earlier clearance of forest cover for cultivation around Poomparai and Kukkal, and reduction in rainfall have had great impact on the climate, especially on the quasi-temperate climate experienced during the 1980s and 1990s. Due to the increase in temperature, generalist bird species from the mid and lower elevations (e.g., Plum-headed Parakeet *Psittacula cyanocephala*, Brahminy Kite *Haliastur indus*, Black Kite *Milvus migrans migrans*, Tickell's Blue Flycatcher *Cyornis tickelliae*, Chestnut-headed Bee-eater *Merops leschenaulti*, Red Spurfowl *Galloperdix spadicea*, Red-vented Bulbul *Pycnonotus cafer*, and Common Hawk-cuckoo *Hierococcyx varius*) have moved to higher altitude areas and may be competing with the habitat specialist endemic birds. This needs to be studied.

ENDANGERED

White-bellied Blue Robin *Myiomela albiventris*

VULNERABLE

Nilgiri Wood-pigeon *Columba elphinstonii*

Kashmir Flycatcher *Ficedula subrufra*

Indian Broad-tailed Grass-warbler *Schoenicola platyurus*

NEAR THREATENED

Nilgiri Pipit *Anthus nilghiriensis*

Grey-breasted Laughingthrush *Garrulax jerdoni*

Black-and-Orange Flycatcher *Ficedula nigrorufa*

Nilgiri Flycatcher *Eumyias albicaudatus*

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon *Columba elphinstonii*

Grey-fronted Green-pigeon *Treron affinis*

Malabar Parakeet *Psittacula columbooides*

Malabar Grey Hornbill *Ocyeros griseus*

Nilgiri Pipit *Anthus nilghiriensis*

Grey-headed Bulbul *Microtarsus priocephalus*

White-bellied Blue Robin *Myiomela albiventris*

Wynaad Laughingthrush *Dryonastes delesserti*

Indian Rufous Babbler *Turdoides subrufa*

Black-and-Orange Flycatcher *Ficedula nigrorufa*

Nilgiri Flycatcher *Eumyias albicaudatus*

White-bellied Blue Flycatcher *Cyornis pallipes*

Small Sunbird *Leptocoma minima*

Malabar Woodshrike *Tephrodornis sylvicola*

White-bellied Treepie *Dendrocitta leucogastra*

Nilgiri Flowerpecker *Dicaeum concolor*

OTHER KEY FAUNA

The major predators in this IBA are the Tiger *Panthera tigris* and Leopard *P. pardus*, but the sightings of these two predators have become rare in these sholas due to human disturbance. Barking Deer *Muntiacus muntjak* is the commonest ungulate. Gaur *Bos gaurus* and Wild Boar *Sus scrofa* population is increasing (S. Balachandran, *pers. comm.* 2003). Wild Dog or Dhole *Cuon alpinus* and Sambar *Rusa unicolor* have decreased. Indian Giant Squirrel *Ratufa indica* is found in all suitable forest patches. Bonnet Macaque *Macaca radiata* has increased to pest proportions as tourists feed the animals.

LAND USE

- Forestry
- Overgrazing
- Fuel wood collection

THREATS AND CONSERVATION ISSUES

Though villagers get their fuel requirements from the Wattle plantations bordering the sholas, they also collect dead wood and trees fallen due to landslides and strong winds. Women carrying headloads of firewood is a frequent sight in the morning and the evening. Bombay Shola is the closest source of firewood for Kodaikanal town and has suffered from its unfortunate location. At Vattakanal Shola, landslides regularly topple a large number of trees. The Forest Department is replacing old plantations with native shola forest species such as *Elaeocarpus glandulosus*, *Syzygium densiflora*, *Neolitsea scrobiculata*, *Michelia nilagirica*, and others.

Bombay Shola, which survives within Kodaikanal municipal limits, though protected, is under threat from dumping of waste and minor tree felling. The emergence of Kodaikanal as a popular hill station has had a disastrous effect on the region's ecology. Human settlements have spread over large areas around the town, and they have even encroached upon forest land. Many species of animals such as the Bear *Melursus ursinus*, Tiger *Panthera tigris*, and the Nilgiri Tahr *Nilgiritragus hylocrius* have disappeared. Names such as 'Tiger Shola' certify that these species existed in the region. Even the Nilgiri Langur, that was once common, has disappeared from the forests around Kodaikanal.

The growing number of people living in and visiting the hill station has resulted in mountains of half-burnt waste and garbage dumped in nearby Blackburn Shola. Despite effective bans on plastic and the construction of a waste treatment plant, pollution remains a major concern (Ian Lockwood, *pers. comm.* 2003).

Tremendous changes in the bird community structure have been noticed in and around this site. Urbanization

around Kodaikanal has led to temperature increase, due to which generalist bird species from the mid and lower elevations (e.g. Brahminy Kite *Haliastur indus*, Black Kite *Milvus migrans migrans*, Chestnut-headed Bee-eater *Merops leschenaulti*, House Crow *Corvus splendens*) are now seen at higher altitudes, where they compete with habitat specialist endemic birds.

The invasion of weeds *Lantana* and *Eupatorium* is very common. The pressure on the forests for firewood keeps increasing, which leads to degradation and loss of forest cover.

Fringe species, such as *Solanum* spp. and *Robus* spp. have benefited from forest clearance and are spreading fast. The Asiatic Elephant *Elephas maximus*, which was commonly reported from this area, has disappeared. Thanks to a ban on hunting, the Wild Boar population is increasing, resulting in increase in crop damage. Due to the extension of agricultural activities, pesticide use has also increased, resulting in the loss of biodiversity. This decrease is visible in the larger insects like butterflies, cicadas, dragonflies, and damselflies. Increase in human population has led to water scarcity in the hills.

The area under reserve forest in Kodaikanal Division is dwindling gradually due to handing over of forested land to State and Central Government departments, for various purposes such as horticulture, Bee Research Station, Sheep Breeding Research Station, and irrigation projects. For instance, the Industry and Commerce Department and Gandhi Niketan Ashram at Tiger Shola were given land to establish the Bee Research Station. Some areas in the reserve forest have been given on lease to other departments of the State and Central Governments and to the public for right of way, access to the temple, access to water from the streams, and for road building and channels. Licences have been issued by the Collector for diverting water from jungle streams to Adukkam village at Tiger Shola. However, with the declaration of Kodaikanal Wildlife Sanctuary, non-forestry use of the land has been curtailed.

KEY CONTRIBUTORS

S. Balachandran, Ian Lockwood.

KEY REFERENCES

Balachandran, S., Rahmani, A.R., and Ezhilarasi, N. (2003) Revaluation of Bird Community Structure of Palni Hills, with Special Reference to Threatened and Endemic Species. Annual Report 2002–2003. Bombay Natural History Society, Mumbai. Pp. 26.

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Vol. 1: Non-passerines. Lynx Edicions, Barcelona.

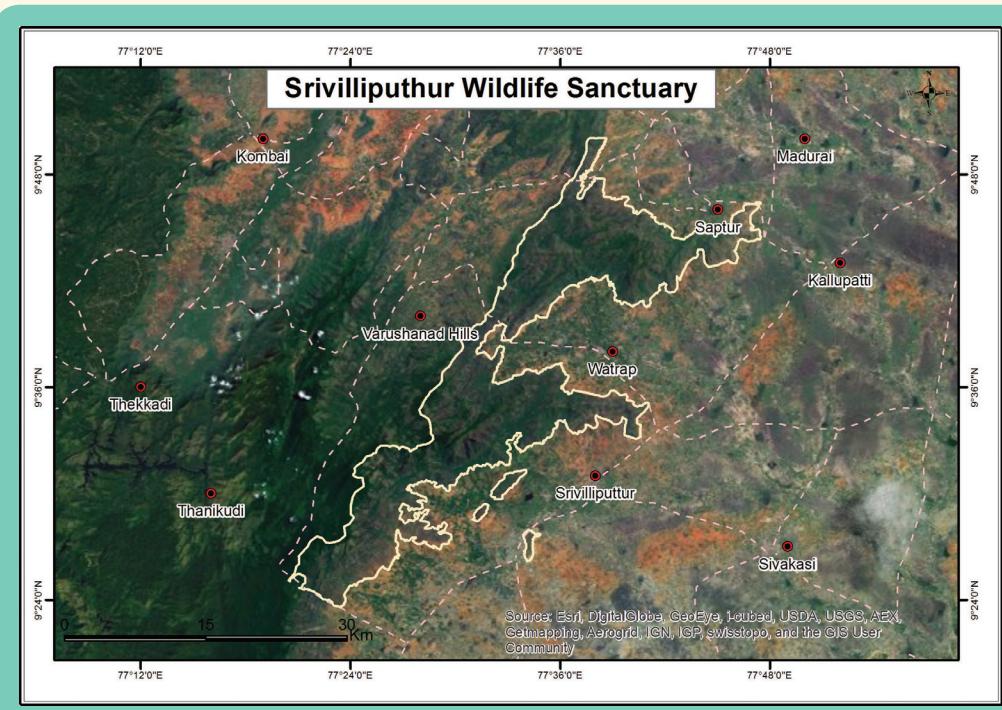
Mathew, K.M. (1999) The Flora of the Palni Hills. Part I. The Rapinat Herbarium, St. Joseph's College, Tiruchirapalli.

SRIVILLIPUTHUR WILDLIFE SANCTUARY

IBA Site Code	: IN-TN-23	Rainfall	: 1,000–1,200 mm
Administrative Region (State)	: Tamil Nadu	Temperature	: Not available
District	: Virudhunagar	Biogeographic Zone	: Western Ghats
Coordinates	: 9° 31' 16" N, 77° 25' 07" E	Habitats	: Tropical Dry Deciduous Forest, Tropical Moist Deciduous Forest, Tropical Semi-evergreen Forest, Tropical Wet Evergreen Forest
Ownership	: State		
Area	: 48,520 ha		
Altitude	: 200–1,200 msl		

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats)

PROTECTION STATUS: Wildlife Sanctuary, established December, 1988.



GENERAL DESCRIPTION

The Srivilliputhur, also called as Grizzled Squirrel Wildlife Sanctuary is located c. 40 km south of Madurai, north of Sivagiri Hills. Its southwestern boundary abuts the Periyar Tiger Reserve in Kerala, and its northwestern side is contiguous with Megamalai Reserve Forest. Its southern limit is contiguous with Sivagiri Reserve Forest of the Tirunelveli Forest Division.

The terrain is mostly undulating with high grassy and barren rocky peaks, while the slopes and deep valleys have very dense vegetation. Srivilliputhur receives the major part of its annual rainfall from the northeast monsoon, between October and November. It also receives heavy rain from the southwest monsoon. It is located on the eastern slopes of the Western Ghats and forms the eastern watershed boundary

of the River Periyar. It has some of the best protected forests south of the Palghat Gap.

The vegetation of the sanctuary consists of Tropical Dry Deciduous Forest, Tropical Moist Deciduous Forest, and Tropical Thorn Forest. Tropical Dry Deciduous Forest dominates in the eastern and lower altitude slopes. It is also an important habitat for the Grizzled Giant Squirrel *Ratufa macroura dandolena*. The higher areas have Tropical Moist Deciduous and Wet Evergreen Forests. The eastern lowlands bear Tropical Thorn Forest.

AVIFAUNA

About 220 bird species have been recorded in this area, which includes 17 restricted-range and endemic species found in the Western Ghats (J. Joshua, *pers. comm.* 2003).

There is clear evidence of change in species composition according to change in altitude and habitat. The valleys with Moist Deciduous, Semi-evergreen, and Evergreen Forests on the slopes are home to the Small Sunbird *Nectarinia minima*, White-bellied Treepie *Dendrocitta leucogastra*, White-bellied Blue-flycatcher *Cyornis pallipes*, and many endemic species that still exist in good numbers. The Nilgiri Wood-pigeon *Columba elphinstonii* is also frequently sighted in this area.

Raptors are well represented, with more than 14 species including the Critically Endangered White-rumped Vulture *Gyps bengalensis* and Long-billed Vulture *G. indicus*. Now they are rarely seen. Another raptor, the Rufous-bellied Eagle *Hieraetus kienerii*, also exists in this area. Three hornbill species, the Great Pied Hornbill *Buceros bicornis*, Malabar Pied Hornbill *Anthracoceros coronatus*, and Malabar Grey Hornbill *Ocyceros griseus* are found in good numbers and can be sighted frequently.

CRITICALLY ENDANGERED

White-rumped Vulture (old record)	<i>Gyps bengalensis</i>
Long-billed Vulture (old record)	<i>Gyps indicus</i>

ENDANGERED

White-bellied Blue Robin	<i>Myiomela albiventris</i>
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VULNERABLE

Asian Woollyneck	<i>Ciconia episcopus</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Great Pied Hornbill	<i>Buceros bicornis</i>
Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Grey-fronted Green-pigeon	<i>Treron affinis</i>
Malabar Parakeet	<i>Psittacula columboidea</i>
Malabar Grey Hornbill	<i>Ocyceros griseus</i>
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
White-bellied Blue Robin	<i>Myiomela albiventris</i>
Wynaad Laughingthrush	<i>Garrulax delesserti</i>
Indian Rufous Babbler	<i>Turdoides subrufa</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>
Small Sunbird	<i>Leptocoma minima</i>
Malabar Woodshrike	<i>Tephrodornis sylvicola</i>
White-bellied Treepie	<i>Dendrocitta leucogastra</i>
Nilgiri Flowerpecker	<i>Dicaeum concolor</i>

The two dams, Pilavakkal and Kallar, attract waterbirds such as Oriental Darter *Anhinga melanogaster*, storks, egrets, a few ducks, and waders.

OTHER KEY FAUNA

The Grizzled Giant Squirrel *Ratufa macroura dandolena* is the key mammal of the Srivilliputhur Sanctuary. It is endemic to the southern Western Ghats and Sri Lanka (Prater 1990). The Grizzled Giant Squirrel is found in south India and Sri Lanka. Its distribution range in India spans the area between the Grizzled Squirrel Wildlife Sanctuary in the south (Joshua & Johnsingh 1994) and Hosur Forest Division in the north (Baskaran *et al.* 2011). Within this range, the Grizzled Giant Squirrel is confined to low elevation riparian forest and low precipitation zones of the Western Ghats. It is found in another IBA, the Chinnar Wildlife Sanctuary. Scattered populations are also found in Theni Forest Division, Anamalai Tiger Reserve, Palni Hills, Sirumalai Hills, Cauvery Wildlife Sanctuary and Hosur Forest Division. Recently, it was found in Thiruvannamalai Forest Division that adjoins the Eastern Ghats (Babu and Kalaimani 2014).

This IBA also has a good population of large mammals and smaller carnivores. Threatened mammals found here are Indian Giant Squirrel *Ratufa indica indica*, Slender Loris *Loris tardigradus*, Nilgiri Langur *Trachypithecus johni*, Lion-tailed Macaque *Macaca silenus*, Nilgiri Marten *Martes gwatkinsii*, Nilgiri Tahr *Hemitragus hylocrius*, Asiatic Elephant *Elephas maximus*, Gaur *Bos gaurus*, Sloth Bear *Melursus ursinus*, Indian Wild Dog or Dhole *Cuon alpinus*, and Sambar *Rusa unicolor*.

Nineteen species of reptiles were recorded during a study conducted by the World Wide Fund for Nature-India (Bhupathy & Kannan 2002). The following three species are endemic to the Western Ghats: Draco or Gliding Lizard *Draco dussumieri*, Large-scaled Calotes *Calotes grandisquamis* and Southern Green Calotes *C. calotes* (Malhotra & Davis 1991).

LAND USE

- Nature conservation

THREATS AND CONSERVATION ISSUES

- Poaching
- Illicit cutting of trees
- Overgrazing by livestock
- Seasonal fires
- Lopping for minor non-timber forest products
- Grizzled Giant Squirrel moving/dispersing into private orchards outside the Protected Area

In 2012, wildlife officials submitted a proposal to the State Government to create a new tiger reserve in the existing Grizzled Squirrel Wildlife Sanctuary, as tigers are frequently seen in this region. It is also a very important



SHARAN VENKATESH

The Grizzled Giant Squirrel *Ratufa macroura dandolena* is the key mammal of this IBA.
It is endemic to the southern Western Ghats and Sri Lanka

corridor for Asiatic Elephant. Srivilliputhur Sanctuary is flanked by Tirunelveli Forest Division on the south and in the northwest by Theni Forest Division, which is part of the Agasthyamalai Biosphere Landscape. Regularly, elephants from Periyar Tiger Reserve migrate to the Srivilliputhur Sanctuary in search of fodder and water, and use this area as part of their home range. The entire area earmarked for declaring as a tiger reserve is to be called Srivilliputhur Megamalai Tiger Reserve.

Earlier, fuel wood cutting was very common (Joshua Johnsingh 1994) but now there is some control on it. Forestry practices like monoculture plantation and weed infestation in the forest should be controlled immediately. Joshua (1992) has reported that the Grizzled Giant Squirrel greatly prefers *Tamarindus indica* trees for foraging and nesting. There are pressures from the locals adjoining the forest, and from other areas of the nearest towns Srivilliputhur and Rajapalayam. Srivilliputhur, which is famed for milk products, has a large population of livestock that uses this forest intensively. Livestock grazing must be stopped entirely. Effective conservation and management actions need to be implemented to ensure the protection of biodiversity within the sanctuary.

KEY CONTRIBUTOR

Justus Joshua

KEY REFERENCES

Babu, S. and Kalaimani, A. (2014) New site record of Grizzled Giant Squirrel *Ratufa macroura* from Thiruvannamalai Forest Division, Eastern Ghats, Tamil Nadu, India. *Journal of Threatened Taxa* 6(2): 5492–5493; <http://dx.doi.org/10.11609/JoTT.o3680.5492-3>.

Baskaran, N., Senthilkumar, K., and Saravanan, M. (2011) A new site record of the Grizzled Giant Squirrel *Ratufa macroura* (Pennant, 1769) in the Hosur forest division, Eastern Ghats, India and its conservation significance. *Journal of Threatened Taxa* 3(6): 1837–1841; <http://dx.doi.org/10.11609/JoTT.o2632.1837-41>

Bhupathy, S. and Kannan, P. (2002) Status of Agamid lizards in the Western Ghats of Tamil Nadu, India. In: Biodiversity 'Hot Spots' conservation programme (BHCP). Final Report, Vol-I. Forests and Biodiversity Conservation Division, World Wide Fund for Nature-India, New Delhi. Pp. 133–170.

Joshua, J. (1992) Ecology of the endangered Grizzled Giant Squirrel (*Ratufa macroura*) in Tamil Nadu, South India. Ph.D. Thesis submitted to Bharathidasan University, Tiruchirapalli. 131 pp.

Joshua, J. and Johnsingh, A.J.T. (1994) Impact of biotic disturbances on the habitat and population of the endangered grizzled giant squirrel *Ratufa macroura* in south India. *Biological Conservation* 68: 29–34.

Malhotra, A. and Davis (1991) A report on a herpetological survey of the Srivilliputhur Reserve Forest, Tamil Nadu. *JBNHS* 88: 157–166.

Prater, S.H. (1980) *The Book of Indian Animals*. Bombay Natural History Society, Mumbai.

SUCHINDRAM, THEROOR, VEMBANOOR WETLANDS

IN-TN-24

IBA Site Code : IN-TN-24

Administrative : Tamil Nadu

Region (State)

District : Kanyakumari

Coordinates : Centre point of each sub-unit:

Suchindram: 8° 08' 33" N, 77° 28' 00" E;

Theroor: 8° 9' 40" N, 77° 28' 00" E;

Manakudy Estuary: 8° 06' 00" N, 77° 29' 00" E

Ownership : State

Area : c. 885 ha

Altitude : 20 msl

Rainfall : 900–1,500 mm

(annual average 1,460 mm)

Temperature : 10 °C to 38 °C

Biogeographic Zone : Coasts

Habitats : Freshwater Reservoirs

IBA CRITERIA: A4i ($\geq 1\%$ biogeographic population of waterbird)

PROTECTION STATUS: Conservation Reserve, declared January 30, 2012.



GENERAL DESCRIPTION

Suchindram, Theroor, and Vembanoor wetlands, that form this IBA site, lie in Kanyakumari district, at the southernmost tip of peninsular India. These natural tanks are age old, but it is known that Pandyan kings contributed a great deal to the irrigation facilities. Copper plate inscriptions from the 9th century mention Pasumkulam, Venchikulam, Nedumarthukulam, Perumkulam, Elemkulam, and Konadunkulam. The Pandyan king Veeranarayana was known to have had some of the tanks constructed. Veeranarayana Mangalam is named after King Veeranarayana, who built the Therrakal canal to take water from River Pazhayar to the tanks Thathiarkulam, Puthukiramamkulam, and Theroorkulam.

The famous Suchindram tank was built about 1,000 years ago. It is fed from the Kumari Dam constructed across Pazhayar (also called Palayar) below Sabari Dam. Both Sabari and Kumari Dams may be more than 1,000 years old. River Pazhayar collects the entire drainage of the valley and irrigates a substantial part of Nanchilvadu. The main Pazhayar stream passes through Bhuthapandikottar, Thazhakudi, and Suchindram tanks and enters the Manakudi Estuary.

Kanyakumari district receives rainfall from both the southwest and northeast monsoons. The southwest monsoon arrives in June and ends in September, while the northeast monsoon extends from October to the middle of December.

The Suchindram-Theroor-Manakudy Wetland Complex is fed by Pazhayar river and comprises two groups of adjacent inland freshwater wetlands and an estuary. The freshwater units of the site are a combination of the Ramsar Wetland Types O, P, Tp, and 6. The estuarine unit is Type Y. The entire wetland complex supports c. 100 species of wetland birds, including more than 40 long-distance migrants. The freshwater wetland unit accommodates more than 110 species of aquatic plants and 44 species of fish. About 23 species of fish constitute the major fishery of the estuarine unit, which is the southernmost wintering ground in India for migrant birds from the northern hemisphere. The estuarine unit alone provides important habitats for at least 84 species of resident and migratory waterbirds.

Islam & Rahmani (2008) suggested this complex as a potential Ramsar Site, as it fulfils Criteria 2 (wetland supports threatened ecological communities), Criteria 4 (wetland provides refuge during adverse conditions to threatened species), and Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies).

AVIFAUNA

The Western Ghats terminate within this IBA. As a result, migratory species from both the eastern and western coasts are found here. About 250 species of birds have been recorded in the district, of which 53 species are migratory, five Near Threatened. Birds such as Spot-billed Pelican *Pelecanus philippensis*, Oriental Darter *Anhinga melanogaster*, Northern Pintail *Anas acuta*, Common Teal *Anas crecca*, Spot-billed Duck *Anas platyrhynchos*, Garganey *Querquedula querquedula*, and Eurasian Coot *Fulica atra* congregate in these tanks, sometimes in thousands. R.B. Grubh (*pers. comm.* 2003) counted huge flocks of Garganey, just before their return migration in March. One flock consisted of nearly 30,000 individuals. According to recent estimates by Wetlands International (2012), the total non-breeding population of this species in South Asia is about 250,000. Hence, the 1% population threshold is 2,500. According to this estimate, these wetlands host about 12% of the total population. This site, therefore, qualifies on the basis of A4i criteria.

This IBA is a major, southernmost wintering ground in mainland India for about 40 migratory bird species from the northern latitudes. More than 25,000 migratory waterfowl and shorebirds were recorded at one time during the peak period, particularly in October when birds arrive and assemble in most favourable locations before dispersal, and again in February when they use these locations for staging before departing for their breeding grounds.

Manakudy Estuary and the adjoining saltpans are located adjacent to Suchindram Tank. The survey carried out in 2008 at this site by S. Balachandran of BNHS

and Sudhamathi, recorded Spot-billed Pelican *Pelecanus philippensis* (80 to 150), Painted Stork *Mycteria leucocephala* (up to 425), Eurasian Spoonbill *Platalea leucorodia* (up to 200), and Black-headed Ibis *Threskiornis melanocephalus* (up to 300) round the year. During the winter, up to 7,000 waders (including nearly 1,000 Pacific Golden Plover *Pluvialis fulva*), three species of ducks numbering 6,000 or more, Greater Flamingo *Phoenicopterus roseus* (700), and seven species of terns (predominantly Common Tern *Sterna hirundo* during autumn passage) were seen. Asian Dowitcher *Limnodromus semipalmatus* was also recorded by them. The Red-necked Phalarope *Phalaropus lobatus* which is otherwise uncommon in India is often seen at this site.

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Spot-billed Pelican	<i>Pelecanus philippensis</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Asian Dowitcher	<i>Limnodromus semipalmatus</i>

OTHER KEY FAUNA

There are more than 44 species of freshwater fish, and over 25 species of estuarine fish in this wetland complex. Some of the prominent ones are *Anguilla bengalensis bengalensis*, *A. bicolor*, *Channa orientalis*, *C. punctatus*, *Glossogobius giuris*, *Heteropneustes fossilis*, *Horadandia atukorali*, *Macrognathus guentheri*, *Mystus montanus*, *M. vittatus*, *Ompok malabaricus*, *Puntius sophore*, *P. tictopunctatus*, *P. vittatus*, *Rasbora* (*Parluciosoma daniconius*), and *Xenentodon cancila*. Tilapia *Oreochromis mossambica* is an introduced and naturalized species, which has an adverse impact on indigenous fish.

The Suchindram-Theroor-Manakudy wetland complex is critical for numerous species of commercial and scientifically important fishes and prawns that use these wetlands for various stages of their lifecycle. Two species of freshwater eels *Anguilla bengalensis* and *A. bicolor* use these wetlands in critical stages of their lifecycle. Manakudy Estuary serves as the principal migratory corridor for young eels (elvers) to reach freshwater wetlands further upland, and for the breeding adults that come down from the freshwater wetlands in their passage to the sea, where they spawn and die. Suchindram and Theroor wetlands, as well as other freshwater wetlands in Kanyakumari district, provide ideal habitats for young eels in their growing years, until they are ready to return to the sea for breeding.

Manakudy Estuary is the spawning ground as well as nursery for commercially important invertebrates such as penaeid prawns, crabs, and others. The commercially important fishes that use this estuary as a nursery include *Mugil* sp., *Lates* sp., carangids, gobids, *Ambassis* sp., *Anguilla* spp., *Sillago* sp., *Therapon* sp., *Liza parsia*, *Gerres*

filamentosus, *Etroplus suratensis*, *Stigmatogobius javanicus*, *Glossogobius giuris*, *Mystus gulio*, *Chanos chanos*, and *Hyporhamphus limbatus* (Grubh 2004, Thara Devi 2003). These fish are consumed locally and also exported. The local fishing community earns livelihood through commercial exploitation of these fishery products.

As these wetlands are surrounded by human habitations and agricultural fields, there are no wild large mammals.

LAND USE

- Agriculture
- Fishing
- Water management

THREATS AND CONSERVATION ISSUES

- Changing land use pattern
- Encroachment
- Infestation of exotic weeds

Most of the water from the freshwater units is used by farmers for cultivation of paddy and banana. The storage and release of water is controlled by the Public Works Department (PWD) of Tamil Nadu state. Some units of the freshwater wetlands are used by private individuals for stocking and rearing commercial fish. Other areas, including the estuary, are exploited by local people for traditional fishing. Lotus farming is done in a major portion of the freshwater units. Substantial portions of the wetlands, especially along the shoreline, are illegally occupied by private individuals. Protection of wildlife in and around the wetlands is in the purview of the Forest Department (Wildlife), Kanyakumari district.

Within the IBA: The major threats to the area are encroachment of the shoreline and shallow areas (both freshwater and estuarine wetland units), excessive spread of exotic invasive vegetation (freshwater units), commercial fishery using exotic fishes in the freshwater units, commercial exploitation of lotus (freshwater units), extensive pollution and oxygen depletion of water by industrial effluents from coconut fibre processing industries (estuarine unit).

Outside the IBA: In the surrounding area, private constructions (both freshwater and estuarine units) are taking place.

Poaching is not a major problem, but siltation and weed infestation are posing significant problems for these tanks. Local NGOs have submitted proposals to the Government to protect these wetlands (Grubh & Grubh 1989), not only for the birds but also as a source of water for irrigation and recharging of wells.

Based on the recommendations of the Institute for Restoration of Natural Environment (Grubh 1995, 2012), the Principal Chief Conservator of Forests of the Tamil Nadu Forest Department recommended that the Suchindram-Theroor-Manakudy wetland complex be declared a Conservation Reserve. By T.N. Government Order Ref. No. G.O. (D) No.39, dated 30.01.2012), Environment and Forests (FR.5) Department, “it was decided to take steps to protect the wetlands of Suchindram-Theroor-Manakudy as Conservation Reserve in Kanyakumari District and for development of bird conservation”. In response to this recommendation, the Government of Tamil Nadu has released first-year funding to the Forest Department to develop this site. A detailed five-year management plan for developing this site as a Conservation Reserve is being finalized (Grubh 2014).

KEY CONTRIBUTORS

Robert Grubh, Shailaja Grubh and V. Kannan

KEY REFERENCES

Grubh, K. (2004) Impact of coir-waste effluent on the ecology of estuaries with reference to fish. M.Sc. dissertation. Manonmaniam Sundaranar University, Centre for Marine Science and Technology, Rajakkamangalam, KK district, T.N., India.

Grubh, R.B. (1995) Conservation and management of Suchindram Kulam wetland in southern India for promotion of agriculture, fishing and ecotourism. Final Technical Report for the Biodiversity Support Program Research Grants Competition. Institute for Restoration of Natural Environment, Nagercoil, T.N., India.

Grubh, R.B. (2012) Suchindram-Theroor-Manakudy Conservation Reserve – A proposal. Institute for Restoration of Natural Environment. Submitted to TN Forest Department.

Grubh, R.B. (2014) Suchindram-Theroor-Manakudy Conservation Reserve Management Plan (April 1, 2014 to March 31, 2019). Draft report submitted to the TN Forest Department.

Grubh, R. and Grubh, S. (1989) *Suchindram Kulam: A Waterbird Sanctuary for Kumari Distict*. Bombay Natural History Society, Bombay.

Islam, M.Z. and Rahmani, A.R. (2008) *Potential and Existing Ramsar Sites in India*. Indian Bird Conservation Network: Bombay Natural History Society, BirdLife International and Royal Society for the Protection of Birds. Oxford University Press. Pp. 592.

Thara Devi, C.S. (2003) Ecobiological studies of Manakudy Estuary. Ph.D. Thesis. Manonmaniam Sundaranar University, T.N., India. Pp. 177.

Wetlands International (2012) *Waterbirds Population Estimates: Fifth Edition*. Wetlands International Global Series No. 12. Wageningen, The Netherlands. (online version)

THAISHOLA

IBA Site Code	: IN-TN-25
Administrative Region (State)	: Tamil Nadu
District	: Nilgiri (S.Forest Division)
Coordinates	: 11° 30' 45" N, 76° 28' 36" E
Ownership	: State
Area	: 603 ha

Altitude	: 2,200 msl
Rainfall	: 1,240 mm
Temperature	: 9 °C to 21 °C
Biogeographic Zone	: Western Ghats
Habitats	: Montane Wet Temperate Forest, Tropical Secondary Scrub

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats), A3 (Biome 7: Sino-Himalayan Temperate Forest)

PROTECTION STATUS: Not officially protected.

MAP NOT AVAILABLE

GENERAL DESCRIPTION

Thaishola lies at the southwestern end of the Nilgiri Hills. *Taiashola* (= mother forest in Tamil), as the name suggests, is a large, dense, undisturbed natural forest. A considerable area of the forest was reclaimed for tea plantation in the past, but now the remaining area is well protected. The forest, being undisturbed, harbours a host of resident and migratory bird species. There have been few botanical explorations in this area, and research on the bird community was almost nonexistent until a recent initiative by the BNHS.

The major vegetation type at this site is Shola (Southern Montane Wet Temperate Forest), as classified by Champion & Seth (1968). *Rhododendron nilagiricum*, *Rubus* spp., *Strobilanthes* spp., *Rhodomyrtus tomentosa*, and *Solanum* spp. are commonly seen at the forest edges. These forests also harbour in their dense undergrowth a variety of ground as well as epiphytic orchids.

The shola forest in this IBA is generally tall, up to 20 m. There is no grassland in the vicinity, but a few patches of plantation can be seen at the fringes. Thick shola stretches over the top of the hill, and is surrounded by the tea plantations of the Thaishola Tea Estate.

AVIFAUNA

Thaishola is an important area for the conservation of Threatened birds in the Upper Nilgiris. Several species, including the Malabar Trogon *Harpactes fasciatus*, Grey-headed Bulbul *Pycnonotus priocephalus*, and Yellow-browed Bulbul *Iole indica* have been recorded from this IBA site. Threatened species such as Black-chinned (Nilgiri) Laughingthrush *Strophocincla cachinnans* (EN), Nilgiri Wood-pigeon *Columba elphinstonii* (VU), and White-bellied Shortwing *Brachypteryx major* (now called Nilgiri Blue Robin *Myiomela major*) (EN) are frequently sighted in this pristine shola habitat (Zarri *et al.* 2004). Thaishola is also home to several resident and migrant raptor species, including the

White-eyed Buzzard *Butastur teesa*, Long-legged Buzzard *Buteo rufinus*, Crested Serpent-eagle *Spilornis cheela*, and Black Eagle *Ictinaetus malayensis*.

The site lies in the Western Ghats Endemic Bird Area (EBA 123) where Stattersfield *et al.* (1998) had listed 16 restricted-range species. Based on recent taxonomic changes (Rasmussen & Anderton 2005, 2012; del Hoyo & Collar 2014), we now find that there are 26 endemic species in the Western Ghats. Of these, 11 have been reported from this IBA.

Thaishola is located in Biome 10 (Indian Peninsula Tropical Moist Forest). Fifteen species represent this biome, of which five have been recorded in this site. The site is an important wintering area for many birds that are listed in other biomes, such as Tickell's Leaf-warbler *Phylloscopus affinis*, Large-billed Leaf-warbler *Phylloscopus magnirostris*,

ENDANGERED

Black-chinned Laughingthrush	<i>Strophocincla cachinnans</i>
Nilgiri Blue Robin	<i>Myiomela major</i>

VULNERABLE

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>

NEAR THREATENED

Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Malabar Parakeet	<i>Psittacula columbooides</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Nilgiri Blue Robin	<i>Myiomela major</i>
Black-chinned (Nilgiri) Laughingthrush	<i>Strophocincla cachinnans</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>
Small Sunbird	<i>Leptocoma minima</i>
White-bellied Treepie	<i>Dendrocitta leucogastra</i>
Nilgiri Flowerpecker	<i>Dicaeum concolor</i>

and Indian Blue Robin *Larvivora =Luscinia brunnea*.

This site qualifies as an IBA on the basis of three criteria: A1 (globally Threatened species); A2 (11 endemic species confined to the Western Ghats EBA 123); and A3 (biome-restricted species).

OTHER KEY FAUNA

Thaishola harbours almost all the mammals that can be expected in a Montane Evergreen Shola habitat. Troops of Nilgiri Langur *Trachypithecus johnii* are seen or heard throughout the forest. Tiger *Panthera tigris* and Leopard *P. pardus* are uncommonly sighted and their major prey Sambar *Rusa unicolor* and Barking Deer *Muntiacus muntjak* are very common. Asiatic Elephant *Elephas maximus* frequent this site during their seasonal migration through the Nilgiris. Golden Jackal *Canis aureus* and packs of Wild Dog *Cuon alpinus* are also commonly reported. Besides, the forest provides home to a number of small carnivores such as Small Indian Civet *Viverricula indica*, Brown Palm Civet *Paradoxurus jerdoni*, Common Mongoose *Herpestes edwardsi*, and lesser cats.

LAND USE

- Forest

THREATS AND CONSERVATION ISSUES

Thaishola is under the control of the Forest Department, and the surrounding land under the Thaishola Tea Estate management. Though the present estate management has taken special care to strictly control human disturbance of any sort from the resident workers in the habitat, commercial interests in future could become a problem for the area.

Presently, the Thaishola Tea Estate is organic-in-progress, and has minimized the use of inorganic pesticides, which are potentially hazardous to birds in particular. The inclusion of this IBA site in the neighbouring Mukurthi National Park (another IBA) could safeguard this important forest from future commercial exploitation. Grazing, the bane of all Indian forests, is fortunately not seen in Thaishola. Similarly, poaching appears to be minimal due to the protection afforded by the tea estate management and Forest Department.

KEY CONTRIBUTORS

Ashfaq Ahmed Zarri, Asad R. Rahmani.

KEY REFERENCES

Champion, H.G. and Seth, S.K. (1968) *A Revised Survey of Forest Types of India*. Govt. of India Press, Delhi.

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Vol. 1: Non-passerines. Lynx Edicions, Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington D.C. and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2, 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University and Lynx Edicions, Washington D.C., Michigan, and Barcelona.

Stattersfield, A.J., Crosby, M.J., Long, A.J., and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife International Series No. 7. BirdLife International, Cambridge, UK. Pp. 846.

Zarri, A.A., Rahmani, A.R., and Senthilmurugan, S. (2004) Ecology of Shola Grassland. Final Report. Part A of Ecology of Shola and Alpine Grassland Project. Bombay Natural History Society, Mumbai, India. Pp. 112.

TIRUNELVELI RESERVE FOREST, INCLUDING KANYAKUMARI WLS

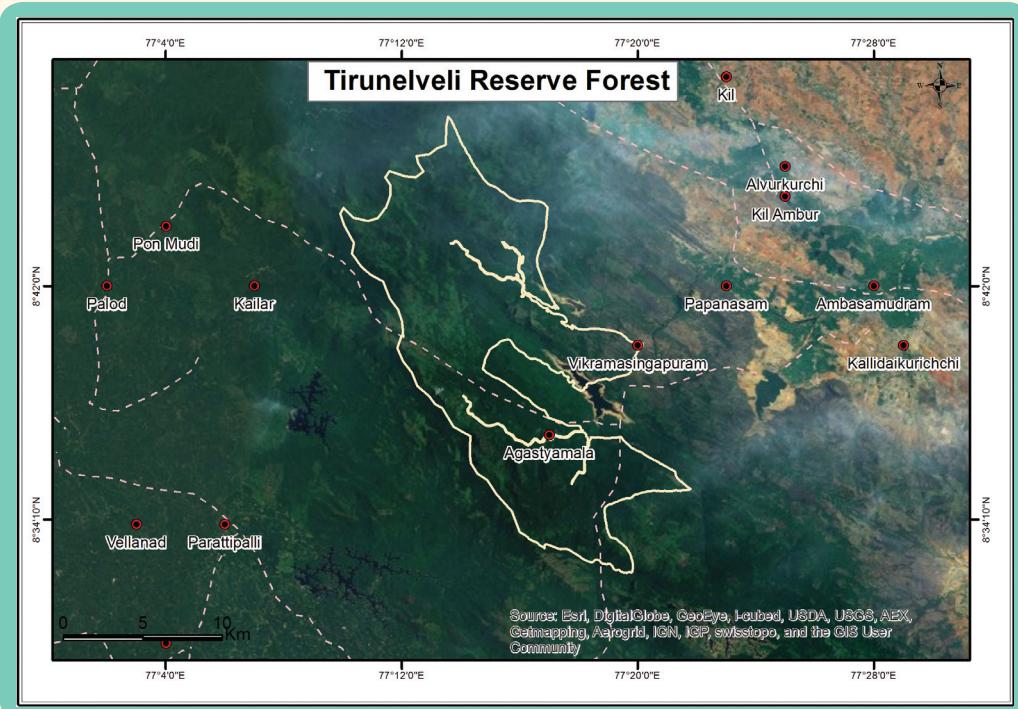
IBA Site Code	: IN-TN-26
Administrative	: Tamil Nadu
Region (State)	
District	: Kanyakumari
Coordinates	: 8° 5'–8° 33' N, 77° 12'–77° 32' E
Ownership	: State
Area	: 50,486 ha (RF, Kanyakumari WLS)

Altitude	: 150–1,600 msl
Rainfall	: 600–3,500 mm
Temperature	: 10 °C to 40 °C
Biogeographic Zone	: Western Ghats
Habitats	: Tropical Dry Evergreen Forest, Montane Wet Temperate Forest, Tropical Moist Deciduous Forest

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats),

A3 (Biome 10: Indian Peninsula Tropical Moist Forest)

PROTECTION STATUS: Kanyakumari Wildlife Sanctuary, declared February, 2007.



GENERAL DESCRIPTION

This IBA, which includes the entire Kanyakumari Forest, lies in Kanyakumari district. The Western Ghats, which run north to south, form a continuous block along the western boundary of the division. The entire area is hilly, and in many places very steep and rugged, with a few prominent peaks. The highest point is 1,829.4 msl at the junction of Mahendragiri, Kalakkad, and Veerapuli Reserve Forests.

AVIFAUNA

No detailed study on avifauna has been done, though the area is very rich in birdlife, mainly due to its range of habitats from West Coast Tropical Evergreen, Montane Wet Temperate Forest, Southern Sub-tropical Hill, to Southern Moist Mixed Deciduous Forests.

The site lies in the Western Ghats Endemic Bird Area (EBA 123), where Stattersfield *et al.* (1998) identified 16 restricted-range species. After recent taxonomic changes, (Rasmussen & Anderton 2005, 2012; del Hoyo & Collar 2014; Gill & Donsker 2014), 26 bird species are endemic to the Western Ghats. Out of these, 15 have been reported from this site, but more are likely to be present.

The biome list is also long. This site falls in Biome 10 (Indian Peninsula Tropical Moist Forest) where BirdLife International (undated) has listed 15 species. Of these, 12 are found here.

A very good population of Great Pied Hornbill *Buceros bicornis* is found in this IBA (T. Ganesh, *pers. comm.* 2014).



CLEMENT FRANCIS M.

Malabar Trogon *Harpactes fasciatus* of Biome-10 is reported from this IBA

OTHER KEY FAUNA

The Forest Department has a long list of animals that used to be present in this area, including the Asiatic Elephant *Elephas maximus*. It is also reported that the Nilgiri Tahr *Nilgiritragus hylocrius* was found on precipitous rock faces near Muthukuzhi. Spotted Deer *Axis axis*, Mouse Deer *Moschiola indica*, and Lion-tailed Macaque *Macaca silenus* are also reported. Tiger *Panthera tigris* and even melanistic Leopard *P. pardus* are reported from this IBA (T. Ganesh, *pers. comm.* 2014).

LAND USE

- Agriculture
- Watershed management

THREATS AND CONSERVATION ISSUES

- Grazing
- Cultivation
- Poaching

This site suffers from a plethora of problems, all anthropogenic. Despite steep cliffs and deep valleys, livestock grazing is a problem. As the site is surrounded by villages, illicit wood-cutting is a regular feature. Many parts have been cleared for cultivation. Poaching of Nilgiri Tahr by armed police personnel, and sometimes of other wild animals, including elephants, has been noticed.

KEY CONTRIBUTORS

IBA seminar participants, T. Ganesh.

ENDANGERED

White-bellied Blue Robin	<i>Myiomela albiventris</i>
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VULNERABLE

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>

NEAR THREATENED

Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Travancore Laughingthrush	<i>Strophocincla meridionale</i>
Great Pied Hornbill	<i>Buceros bicornis</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>

ENDEMIC BIRD AREA 123: WESTERN GHATS

Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Malabar Parakeet	<i>Psittacula columbooides</i>
Malabar Grey Hornbill	<i>Ocyceros griseus</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
White-bellied Blue Robin	<i>Myiomela albiventris</i>
Wynaad Laughingthrush	<i>Dryonastes delesserti</i>
Travancore Laughingthrush	<i>Strophocincla meridionale</i>
Indian Rufous Babbler	<i>Turdoides subrufa</i>
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>
Small Sunbird	<i>Leptocoma minima</i>
White-bellied Treepie	<i>Dendrocitta leucogastra</i>

BIOME 10: INDIAN PENINSULA TROPICAL MOIST FOREST

Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>
Sri Lanka Frogmouth	<i>Batrachostomus moniliger</i>
Jerdon's Nightjar	<i>Caprimulgus atripennis</i>
Indian Swiftlet	<i>Aerodramus unicolor</i>
Malabar Trogan	<i>Harpactes fasciatus</i>
White-cheeked Barbet	<i>Psilopogon viridis</i>
Malabar Barbet	<i>Psilopogon malabaricus</i>
Malabar Whistling-thrush	<i>Myophonus horsfieldii</i>
Indian Scimitar-babbler	<i>Pomatorhinus horsfieldii</i>
Dark-fronted Babbler	<i>Rhopocichla atriceps</i>
Loten's Sunbird	<i>Cinnyris lotenius</i>
Black-throated Munia	<i>Lonchura kelaarti</i>

KEY REFERENCES

BirdLife International (undated) *Important Bird Areas (IBAs) in Asia: Project Briefing Book*. BirdLife International, Cambridge, UK. Unpubl.

del Hoyo, J. and Collar, N.J. (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World*. Vol. 1: Non-passerines. Lynx Edicions, Barcelona.

Gill, F. and Donsker, D. (Eds) (2014) IOC World Bird List (v 4.3). doi: 10.14344/IOC.ML.4.3.

Rasmussen, P.C. and Anderton, J.C. (2005) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2. Smithsonian Institution and Lynx Edicions, Washington, DC and Barcelona.

Rasmussen, P.C. and Anderton, J.C. (2012) *Birds of South Asia: The Ripley Guide*. Vols 1 & 2, 2nd edn. National Museum of Natural History, Smithsonian Institution, Michigan State University and Lynx Edicions, Washington, DC, Michigan, and Barcelona.

Stattersfield, A.J., Crosby, M.J., Long, A.J., and Wege, D.C. (1998) *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. BirdLife International Series No. 7. BirdLife International, UK. Pp. 846.

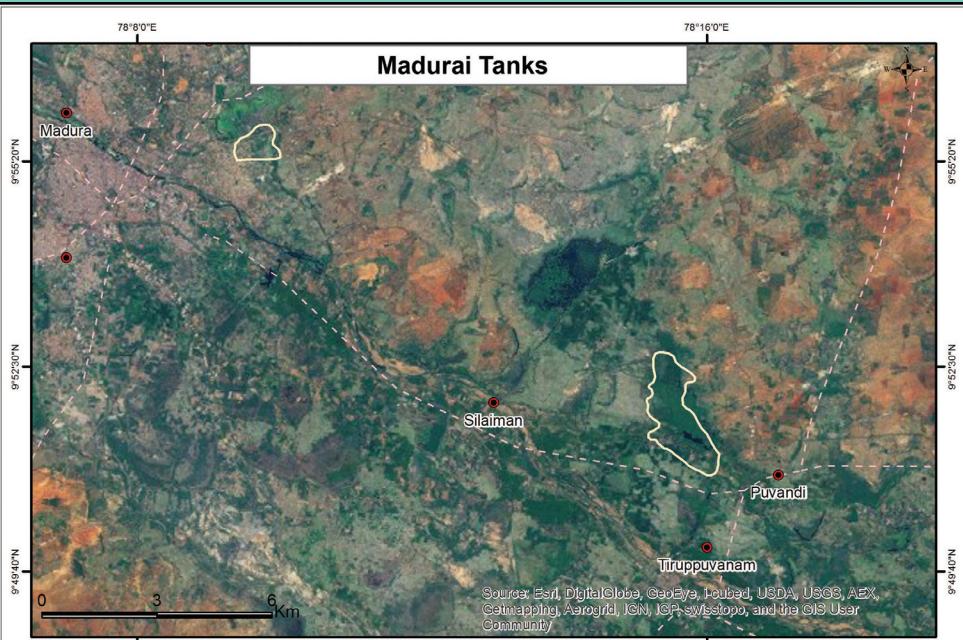
MADURAI TANKS (VANDIYUR, KUNNATHUR, AVANIAPURAM)

IBA Site Code	: IN-TN-27
Administrative Region (State)	: Tamil Nadu
District	: Madurai
Coordinates	: 09° 55' 17" N, 78° 09' 14" E
Ownership	: Municipal Corporation
Area	: 278 ha [To be updated with the areas of the three tanks.]

Altitude	: 136.8 msl
Rainfall	: Not available
Temperature	: Not available
Biogeographic Zone	: Deccan Peninsula
Habitats	: Aquatic, Freshwater reservoir

IBA CRITERIA: A1 (Threatened species)

PROTECTION STATUS: Not officially protected.



GENERAL DESCRIPTION

There are a number of tanks around the city of Madurai. These are the traditional *kanmais* (human-made tanks) that were created for irrigation in Tamil Nadu, which is mostly arid. The smaller tanks around Madurai seem to be disappearing because of various factors, and so the significance of the remaining waterbodies is increasing.

Vandiyur and Kunnathur are probably the two largest tanks near Madurai. Vandiyur and Kunnathur are fed both by the northeast monsoon rains and the Periyar-Vaigai irrigation system. This irrigation system brings water from the Periyar river, in Kerala, and the seasonal Vaigai. The water is diverted to the tanks through channels. In most years, the tanks contain water till February-March, after which they become dry.

A third tank, Avaniapuram, is also of importance for waterbirds in this area. What was probably the first recorded observation of Spot-billed Pelican *Pelecanus philippensis* for the area (Sathasivam 1997) was made at Avaniapuram. This tank is different from those at Vandiyur and Kunnathur in that it has a perennial source of water from a sewage treatment plant. The outflow also supports a vast wetland (grasses) in the dry landscape. *Prosopis chilensis* and *Ipomoea carnea* dominate the vegetation around the tanks, which are infested with Water Hyacinth *Eichhornia crassipes*.

AVIFAUNA

The site has become significant as the Spot-billed Pelican *Pelecanus philippensis* is present during the monsoon.

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Pallid Harrier	<i>Circus macrourus</i>

About 150 Spot-billed Pelicans were reported from this site in April 1997 (Sathasivam 1997). Apart from this, the site harbours several resident and migratory waterfowl. The significant species are Lesser Whistling-duck *Dendrocygna javanica*, Knob-billed or Comb Duck *Sarkidiornis melanotos*, Cotton Pygmy-goose *Nettapus coromandelianus*, Spot-billed Duck *Anas poecilorhyncha*, Garganey *Querquedula querquedula*, Northern Pintail *A. acuta*, Northern Shoveller *Spatula clypeata*, Common Pochard *Aythya ferina*, Pallid Harrier *Circus macrourus*, Purple Swamphen *Porphyrio porphyrio* Eurasian Coot *Fulica atra*, Black-winged Stilt *Himantopus himantopus*, Pheasant-tailed Jacana *Hydrophasianus chirurgus*, Eurasian Spoonbill *Platalea leucorodia*, Little Grebe *Tachybaptus ruficollis*, Oriental Darter *Anhinga melanogaster*, Little Cormorant *Microcarbo niger*, and Indian Cormorant *Phalacrocorax fuscicollis* (T. Badrinarayanan, unpubl. data).

The presence of pelicans has been growing stronger since they were first seen at these tanks, nearly 20 years ago. A number of species that were not reported in the 1930s/1940s or seen in the 1970s and 1980s are appearing now. For example, large numbers of Glossy Ibis *Plegadis falcinellus* are found at the tanks (Nichols 1944–1945, Badrinarayanan and Sathasivam 2002).

OTHER KEY FAUNA

As the tanks lie close to the city, the site does not have any large mammal of conservation concern.

LAND USE

- Fishing
- Water management

THREATS AND CONSERVATION ISSUES

- Heavy drainage flow from the city into Vandiyur and Kunnathur tanks
- Dumping of waste in the tank
- Expanding human population
- Fishing, including the use of explosives

As the tanks are close to Madurai city, there is heavy traffic on the roads surrounding Vandiyur Tank, while Kunnathur is slightly inside and hence comparatively



Besides Spot-billed Pelican, Vandiyur and Kunnathur Tanks have a large number of resident birds, such as Purple Swamphen *Porphyrio porphyrio*

ASHISH KOTHARI

undisturbed. Local conservationists have given a proposal to the Forest Department to declare the two tanks together as bird sanctuary. According to Sathasivam (1997), poachers use explosives for fishing.

KEY CONTRIBUTORS

V. Kannan, S. Badrinarayanan, S. Balachandran, J.C. Daniel.

KEY REFERENCES

Badrinarayanan, T. and Sathasivam, K. (2002) Unusually large congregation of Glossy Ibis (*Plegadis falcinellus*) at Madurai. *Newsletter for Birdwatchers* 42(1): 13.

Nichols, E.G. (1944–1945) Occurrence of birds in Madurai District. *JBNHS* 44(3): 387–407, 44(4): 574–584, 45(2): 122–132.

Sathasivam, K. (1997) Notes from Madurai. *Newsletter for Birdwatchers* 37: 86.

Link:

The Hindu (2011) Sewage plant commissioned. *The Hindu* 24 February 2011 <http://www.thehindu.com/todays-paper/sewage-plant-commissioned/article1485518.ece>, downloaded on 6 March 2015.

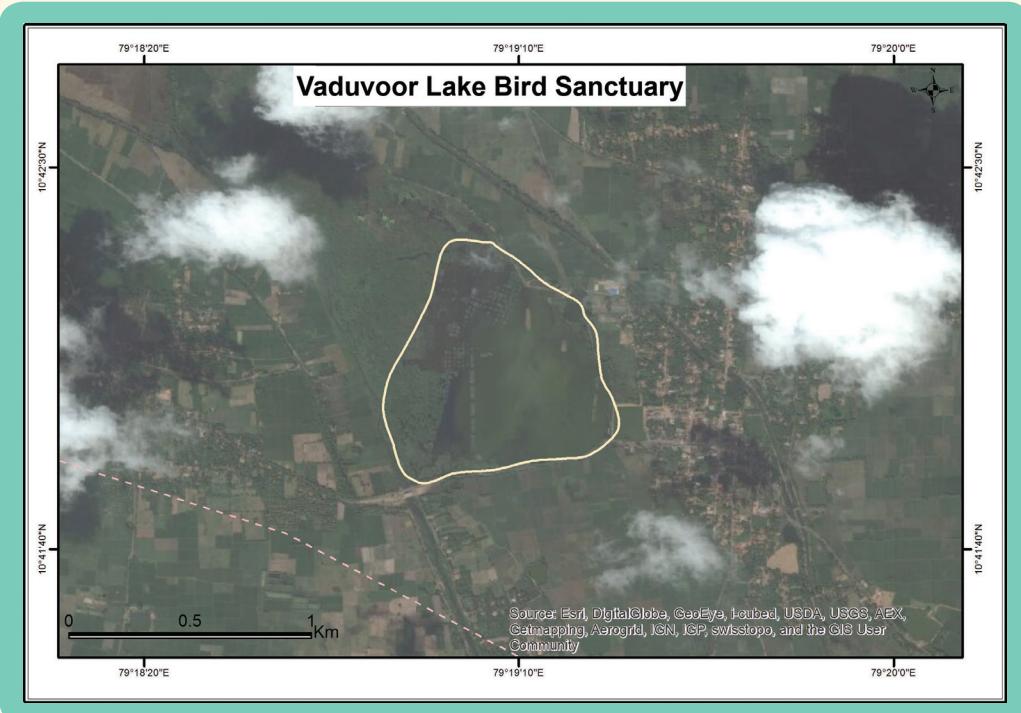
VADUVOOR LAKE BIRD SANCTUARY

IBA Site Code	: IN-TN-28
Administrative Region (State)	: Tamil Nadu
District	: Tiruvarur
Coordinates	: 10° 42' 19" N, 79° 18' 53" E
Ownership	: State

Area	: 128 ha
Altitude	: Not Available
Rainfall	: 80 mm
Temperature	: Not Available
Biogeographic Zone	: Coasts
Habitats	: Freshwater Reservoir

IBA CRITERIA: A1 (Threatened species)

PROTECTION STATUS: Bird Sanctuary, declared July, 1999.



GENERAL DESCRIPTION

The Vaduvoor Lake Bird Sanctuary is situated in Tiruvarur district of Tamil Nadu. It is c. 24 km from Thanjavur and 15 km from Mannargudi. The lake has a depth of c. 2.5 m, and receives water mainly from the northeast monsoon and the Vennaru river. The lake irrigates c. 1,356 acres of agricultural land. Nayvasal and Vaduvoor villages are situated around the sanctuary. The road to Mannargudi borders one side of the lake. The other sides are protected by huge bunds. Migratory birds start to arrive by October and stay up to February or March.

This freshwater lake is rich in aquatic flora, with submerged, floating, and emergent vegetation. *Ipomoea carnea* is seen in many parts of the lake. There are thickets of *Prosopis chilensis*. The Forest Department has planted

Acacia nilotica in the lake environs. Other common trees include Neem *Azadirachta indica* and Tamarind *Tamarindus indica*.

AVIFAUNA

Around 118 species of birds are reported from this IBA, of which 49 are waterbirds (Ananth & Gokula 2011). The sanctuary is well-known for several species, notably the Spot-billed Pelican *Pelecanus philippensis*. Thousands of migratory birds congregate in Vaduvoor during the winter. Although there were historical records of breeding of Spot-billed Pelican, no nests were found during 2008–2011 by Ananth & Gokula (2011).

Guptha *et al.* (2011) found only 1,457 waterbirds belonging to 24 species during their research from January to March, 2006.



BHASKAR MEHTA

Vaduvoor Lake used to have large numbers of Spot-billed Pelican and thousands of birds such as Oriental Darter *Anhinga melanogaster*. (above).

Unfortunately, in recent years, the condition of the tank is not very good

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>

OTHER KEY FAUNA

A few published records are available on the fish, reptile, and amphibian fauna of this lake. Some of the fish recorded are *Ambassis urotaenia*, *Channa punctatus*, *Ophiocephalus* sp., and *Mystus tenegra*.

LAND USE

- Agriculture
- Fishing
- Grazing land
- Water management

THREATS AND CONSERVATION ISSUES

- Indiscriminate fishing
- Overgrazing
- Siltation
- Encroachment
- Invasion by exotic species
- Pollution

The bund is very old and urgently needs repair to avoid a breach during heavy rainfall. Like most other lakes of Tamil Nadu, Vaduvoor is silting up. It needs dredging to increase the depth to store more water. The soil containing bird guano is rich in minerals and is collected by the villagers to use in their crop fields, which is why the villagers provide protection to the birds. Removal of guano-rich soil should be regulated with the cooperation of the villagers, so that the birds are least disturbed. There is some poaching of birds, mainly by outsiders. This could be stopped by the villagers because they benefit from guano. A conservation awareness programme and patrolling by the Forest Department could take care of the poaching problem.

There is a need to avoid over-fishing. Larger mesh size nets should be used, and there should be no fishing during the breeding season of the fish. *Ipomoea carnea* is spreading

fast. Although it provides habitats to some birds and fish, its spread should be regulated. And finally, there is the larger issue of the use of harmful pesticides in the agricultural fields, which enter the lake with the run-off from the fields. Regular monitoring of the water quality through the local college/university could be taken up. Vaduvoor Bird Sanctuary is a good site for research on freshwater ecosystems, fish, birds, impact of pesticides, socio-economic benefits of birds conservation, and regulated use of guano-rich soil.

KEY CONTRIBUTOR

V. Kannan

KEY REFERENCES

Ananth, R.P. and Gokula, V. (2011) Temporal variation in abundance, species richness and diversity of avifauna in Vaduvoor Bird Sanctuary, Tamil Nadu, India. Presented at *Status of Indian Birds and their conservation: First International Conference on Indian Ornithology (ICIO) - 2011*. Sálim Ali Centre for Ornithology and Natural History, Coimbatore, India. Pp. 142–143.

Guptha, M.B., Sridharan, N., Vijayan, L., Thiyyagesan, K., Sandaliyan, S., and Somasundaram, S. (2011) Status of major wetlands and wetland birds in Kanyakumari, Coimbatore, Thanjavur, Thiruvarur, Perambalur, Cuddalore, Nagapattinam and Trichy districts in Tamil Nadu, India. *World Journal of Zoology* 6(3): 235–242.

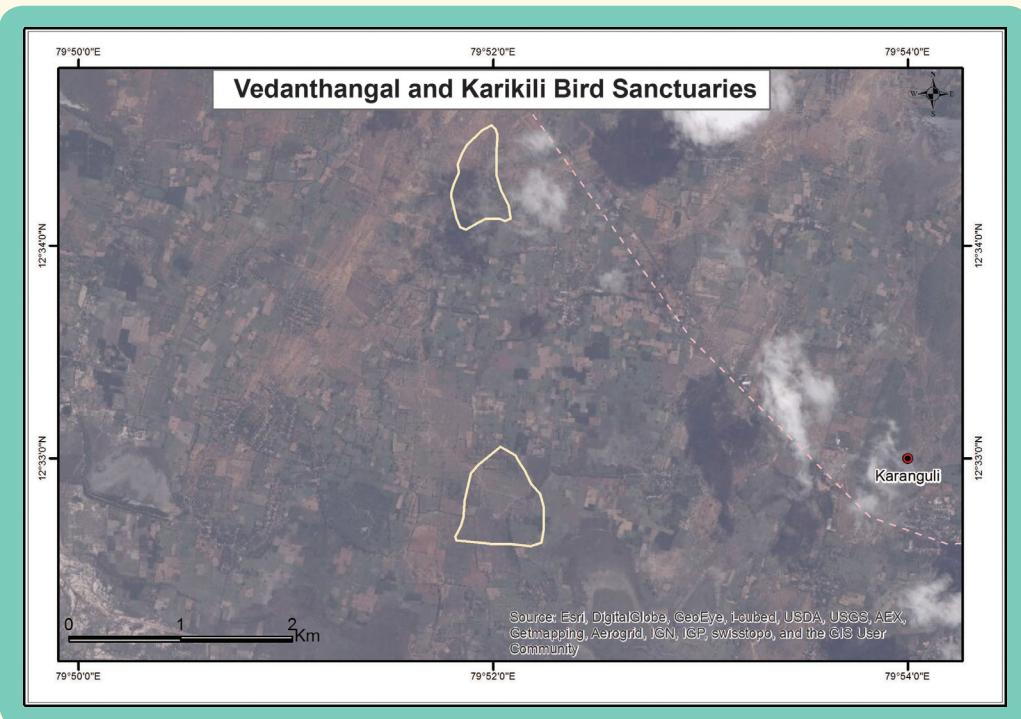
VEDANTHANGAL AND KARIKILI BIRD SANCTUARIES

IBA Site Code	: IN-TN-29
Administration Region (State)	: Tamil Nadu
District	: Chengalpet
Coordinates	: 12° 32' 02" N, 79° 52' 29" E
Ownership	: State

Area	: 80 ha
Altitude	: 25 msl
Rainfall	: 1,100 mm
Temperature	: Not available
Biogeographic Zone	: Deccan Peninsula
Habitats	: Freshwater Reservoir

IBA CRITERIA: A1 (Threatened species), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS: Vedanthangal Bird Sanctuary established 1925, Karikili Bird Sanctuary established in 1998.



GENERAL DESCRIPTION

The Vedanthangal (50 ha) and Karikili (30 ha) Bird Sanctuaries are located c. 85 km southwest of Chennai, in Chengalpet district of Tamil Nadu. These are old water storage reservoirs for irrigation in the Chengalpet plains. They have also become important as breeding sites for large waterbirds. There are several much larger tanks (e.g., the 350 ha Madurantakam Tank) in the surrounding plains, but these are generally less important for wildlife. Vedanthangal Tank receives some water from Madurantakam Tank through a link channel, but Karikili is wholly rainfed.

Vedanthangal Bird Sanctuary is one of the oldest bird sanctuaries in south India. Documentary evidence on its existence is available from 1793. In 1798, the Collector of Chengalpet district issued a prohibitory order against shooting of birds in Vedanthangal. In 1858, a sub-magistrate

revived the 1798 order as it had not been followed strictly, but only in 1936 did the Collector officially recognize Vedanthangal as a sanctuary and sanction government funds towards its maintenance (Venkatraman 1996a).

Vedanthangal has been visited by many ornithologists in the last 100 years. Some of them are Hume & Oates (1889–1890), Packard (1903), Bates (1931), Whistler & Kinnear (1937) during their Vernay Scientific Survey, Sanjeeva Raj (1956), and Spillet (1966).

Vedanthangal has been developed to enhance its value to wildlife; a number of elevated mud islands have been created and planted with trees to provide ideal nesting sites for herons, egrets, and other colonial nesting birds. By contrast, Karikili Tank is undeveloped and remains in much the same condition as Vedanthangal was during the 1950s. Karikili is situated c. 10 km from Vedanthangal,

ENDANGERED	
Black-bellied Tern	<i>Sterna acuticauda</i>
VULNERABLE	
Greater Spotted Eagle	<i>Clanga clanga</i>
NEAR THREATENED	
Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
River Tern	<i>Sterna aurantia</i>

and is, in fact, two small tanks with a combined area of c. 50 ha. Both tanks fill up during the northeast monsoon in October–November. In the immediate vicinity of the tanks there are bare plains, paddyfields, and scrub forest. During the monsoon, shallow pools are formed in many places, which provide additional foraging areas for waterbirds. The area has a tropical monsoon climate, with an average annual rainfall of c. 1,000 mm, mostly during October–November (northeast monsoon).

There are mainly common herbaceous plants in the marshy areas. In the late 1970s, the islands in Vedanthangal were replanted with *Barringtonia acutangula* to replenish the dead and dying trees. These trees are preferred for nesting by Spot-billed Pelican *Pelecanus philippensis*, Asian Openbill *Anastomus oscitans*, and Black-headed Ibis *Threskiornis melanocephalus*.

In 2012, the Chennai Forest Department declared Vedanthangal and Karikili Sanctuaries as no-go zones for real estate developers and banned any kind of real estate ventures in and around these areas. Restrictions were also placed on the construction of factories, industrial units and mining (see link Infrawindow 2012).

This IBA is also a potential Ramsar site as it qualifies for the following Ramsar criteria: Criteria 2 (wetland supports threatened ecological communities), Criteria 5 (wetland regularly supports 20,000 or more waterbirds), and Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies). Ramsar classifies this wetland type as 6 (Water storage impoundment) (Islam & Rahmani 2008).

AVIFAUNA

Vedanthangal and Karikili Tanks fulfil IBA criteria A1 and A4iii and are treated as one IBA site due to their proximity. Both sites are used in common by a large number of waterbirds for nesting (Vedanthangal) and foraging (Karikili). An estimated 30,000 birds are present at Vedanthangal Tank during the breeding season.

Around 130 species of birds are reported from this IBA, mostly common species. The main species at both the tanks are the Indian Cormorant *Phalacrocorax fuscicollis*, Little Cormorant *Microcarbo niger*, Oriental Darter *Anhinga melanogaster*, Black-crowned Night-heron

Nycticorax nycticorax, Grey Heron *Ardea cinerea*, and Asian Openbill *Anastomus oscitans*. A small number of Spot-billed Pelican *Pelecanus philippensis* also visit both tanks. Pelicans breed occasionally in Vedanthangal, mainly on *Barringtonia* trees (Paulraj & Gunasekaran 1988, Venkatraman & Muthukrishnan 1993). According to the booklet produced by the Department of Tourism, Government of Tamil Nadu, 15 species of storks, egrets, and cormorants breed in Vedanthangal. These tanks are also important as roosting sites for many birds, especially Little Cormorant, outside the breeding season. Large numbers of migratory waterfowl are seen on passage and in winter, particularly the Northern Pintail *Anas acuta*, Garganey *Querquedula querquedula*, Northern Shoveller *Spatula clypeata*, Black-winged Stilt *Himantopus himantopus*, and many shorebirds and terns, particularly Whiskered Tern *Chlidonias hybrida*.

Santharam (1999) spotted the globally Threatened Greater Spotted Eagle *Clanga clanga* in 1996 in Vedanthangal.

This site is selected as an IBA mainly because of the occurrence and occasional breeding of the Spot-billed Pelican, and other Near Threatened species and the presence of more than 30,000 waterfowl during winter.

Venkatraman (2009) reported breeding of Glossy Ibis *Plegadis falcinellus* from Vedanthangal; the bird is a common winter visitor in south India.

OTHER KEY FAUNA

There is no large wild mammal of conservation concern in these sanctuaries as they are surrounded by human habitations and agricultural fields.

LAND USE

- Nature conservation and research
- Water management
- Agriculture

THREATS AND CONSERVATION ISSUES

- Fisheries
- Disturbance to birds
- Tourism

At Vedanthangal, thousands of tourists come to observe breeding birds during the nesting season, which causes disturbance (Venkatraman 1996b). These sites are owned by the Tamil Nadu Forest Department. Tourist movement in the sanctuary should be strictly regulated. Non-degradable material should not be allowed.

KEY CONTRIBUTOR

IBA Team

KEY REFERENCES

Bates, R.S.P. (1931) *Bird Life in India*. BNHS, Diocesan Press, Madras. Pp. 187.



V. KANNAN

Vedanthangal is perhaps the oldest bird sanctuary in India, protected since 1798 by the local populace

Hume, A.O. and Oates, E.W. (1889–1890) *Nests and Eggs of Indian Birds*. 2nd edn. R.H. Porter, London. Pp. 432.

Islam, M.Z. and Rahmani, A.R. (2008) *Potential and Existing Ramsar Sites in India*. Indian Bird Conservation Network: Bombay Natural History Society, BirdLife International and Royal Society for the Protection of Birds. Oxford University Press, New Delhi. Pp. 592.

Packard, H.N. (1903) Note on the breeding of certain herons, etc. in Southern India. *JBNHS* 15(1): 138–139.

Paulraj, S. and Gunasekaran, G. (1988) The Vedanthangal Waterbird Sanctuary: a new breeding ground for pelicans and Painted Storks. *JBNHS* 85: 414–415.

Sanjeeva Raj, P.J. (1956) Occurrence of the Spotted-billed Pelican, *Pelecanus philippensis* Gmelin, in the Vedanthangal herony. *JBNHS* 53: 703–704.

Santharam, V. (1999) Records of Greater Spotted Eagle *Aquila clanga* from Southern India. *JBNHS* 96: 470.

Spillet, J.J. (1966) A report on wildlife survey in South and West India. *JBNHS* 65(3): 633–663.

Venkatraman, C. (1996a) Studies on the colonial waterbirds and the characteristics of the lake of the Vedanthangal Bird Sanctuary, Madras, Tamil Nadu. Ph.D. Thesis. University of Madras.

Venkatraman, C. (1996b) Human disturbance a major factor for nest destruction. *Newsletter for Birdwatchers* 36: 33–34.

Venkatraman, C. (2009) Breeding of Glossy Ibis *Plegadis falcinellus* at Vedanthangal Waterbird Sanctuary, southern India. *Indian BIRDS* 5(1): 18–19.

Venkatraman, C. and Muthukrishnan, S. (1993) Density of water birds at Vedanthangal Bird Sanctuary, Tamil Nadu. Pp. 55–60. In: Verghese, A., Sridhar, S., and Charavarthy, A.K. (Eds) *Bird Conservation, Strategies for the Nineties and Beyond*. Ornithological Society of India, Bangalore.

Whistler, H. and Kinnear, N.B. (1937) The Vernay Scientific Survey of the Eastern Ghats (Ornithological Section). *JBNHS* 39: 447–463.

Link: http://www.infrawindow.com/news/realty-developers-banned-near-chennai-bird-sanctuaries_5015/. Accessed in December 2014.

VEERANAM LAKE

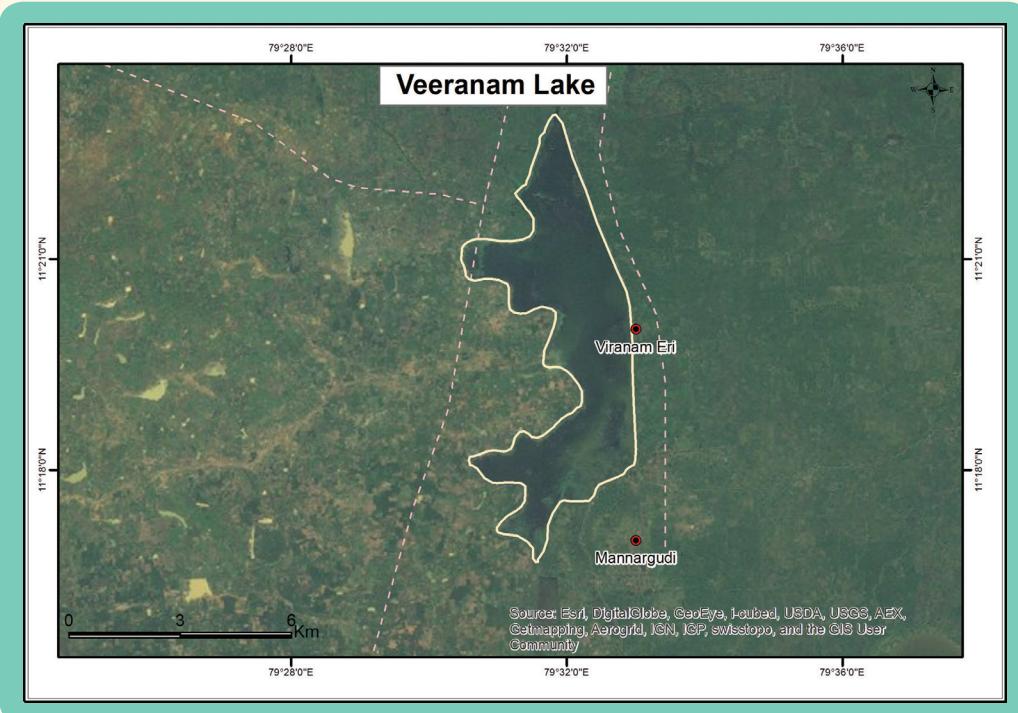
IN-TN-30

IBA Site Code	: IN-TN-30
Administrative Region (State)	: Tamil Nadu
District	: Cuddalore
Coordinates	: 11° 15' 00" N, 79° 32' 30" E
Ownership	: State

Area	: 3,885 ha
Altitude	: 72 msl
Rainfall	: 500–950 mm
Temperature	: 28 °C to 41 °C
Biogeographic Zone	: Deccan Peninsula
Habitats	: Freshwater Reservoir

IBA CRITERIA: A4i ($\geq 1\%$ biogeographic population), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS: Not protected.



GENERAL DESCRIPTION

Veeranam Lake is situated in Cuddalore district, c. 25 km west of Chidambaram town. It is one of the biggest and oldest lakes in Tamil Nadu. The Chola king Paranthaga constructed this lake in the 9th century CE. The book *Ponniyen Selvan*, authored by Kalki in 1950, gives information on this lake, stating that it was constructed over 1,000 years ago by Prince Rajathithar, son of Paranthaga Cholan. The lake was originally called Veeranarayanan Lake. It is c. 16 km long and 8 km broad, with a waterspread of c. 15 sq. km. There are 34 sluices around the lake through which c. 40,000 acres of two talukas, namely Chidambaram and Kattumanarkoil, receive irrigation. The lake is fed by the Vadavar river and Sengal stream. Under the current New Veeranam Project, parts of the lake were desilted recently.

Veeranam Lake has rich aquatic plant diversity with submerged, floating, and emergent species. In several parts of the lake, mats of reeds and *Ipomoea carnea* occur. The trees found in the surrounding areas, islets, and on the bunds are *Acacia nilotica*, *Prosopis chilensis*, *Thespesia populnea*, *Pithecellobium dulce*, *Borassus flabellifer*, *Ficus benghalensis*, *F. religiosa*, and *Azadirachta indica*.

In 2004, the Veeranam Lake Project was completed in order to supply water to Chennai. It is estimated that Chennai gets 180 million litres of water per day from this tank.

This IBA is also a potential Ramsar site as it qualifies for the following Ramsar criteria: Criteria 2 (wetland supports threatened ecological communities), Criteria 5 (wetland regularly supports 20,000 or more waterbirds), and Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies). Ramsar classifies

this wetland as Type 6 (Water storage impoundment) (Islam & Rahmani 2008).

AVIFAUNA

Veeranam Lake is an important area for migrant and resident birds. The lake qualifies for A4iii criteria as it holds, on a regular basis, c. 20,000 waterbirds. According to Thiyyagesan (*pers. comm.* 2001), c. 20,000 Asian Openbill *Anastomus oscitans* visit this area, and V. Santharam (*pers. comm.* 2003) has counted c. 10,000 Black-tailed Godwit *Limosa limosa*. According to Wetlands International (2012), the total breeding population of the Asian Openbill in South Asia is 300,000 and the 1% population threshold is 3,000. Similarly, the total biogeographic population in South Asia of Black-tailed Godwit is 150,000 (Wetlands International 2012). With the sighting of 10,000 in Veeranam, it means that 10% of the population uses this IBA. Therefore, this site also qualifies for A4i criteria.

The Asian Openbill regularly forages in the lake and nests in the adjacent village Tiruchinapuram. According to the locals, Spot-billed Pelican *Pelecanus philippensis* also visit the lake in small numbers, especially during summer when the water level is reduced. Altogether, 54 species have been recorded, of which 81% are waterbirds (Anand *et al.* 1997, Meganathan 2002). Guptha *et al.* (2011) reported only 17 species during their research from January to March 2006.

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Black-tailed Godwit	<i>Limosa limosa</i>

OTHER KEY FAUNA

As the lake is surrounded by agricultural fields and human habitations, there are no large wild mammals of conservation concern. The lake is a rich source of many commercial fish such as *Anabas testudineus*, *Channa punctatus*, *Mastacembelus armatus*, and *Mystus tenegra* (Anand 1999, Bharathi 2002).

LAND USE

- Agriculture
- Domestic use
- Fishing
- Grazing livestock
- Water management
- Fuel wood collection
- Medicinal plant collection

THREATS AND CONSERVATION ISSUES

- Poaching of birds
- Fishing and associated disturbances
- Cattle grazing
- Siltation
- Encroachment
- Weed invasion
- Pollution

Improvements of the Vadavar channel, and strengthening of the Veeranam Lake main bund are two pressing needs.

Use of pesticides is very high in the area, which may be causing problems.

Several research studies have been conducted by the Wildlife Biology Division of Anbanathapuram Vagayara Charity (A.V.C) College, Mayiladuthurai, all of which suggest the importance of this wetland area for the welfare of both the local people and the avifauna.

KEY CONTRIBUTOR

V. Kannan

KEY REFERENCES

Anand, S., Pandiyan, J. and Sethuraman, M. (1997) Studies on the Avifauna of the Veeranam Lake. B.Sc. Dissertation, A.V.C. College, Mannampandal, Mayiladuthurai.

Anand, S. (1999) Effects of desilting of the Veeranam lake on its wildlife and fisheries resources and socio-economic consequences. M.Sc. Dissertation, A.V.C. College, (Autonomous), Mannampandal, Mayiladuthurai.

Bharathi, K. (2002) An assessment of the impacts of new Veeranam project on the hydrological features, avian diversity, and fisheries resources of the Veeranam Lake, Chidambaram taluk, Tamil Nadu, South India. M.Sc. Dissertation, A.V.C. College (Autonomous) Mannampandal, Mayiladuthurai.

Guptha, M.B., Sridharan, N., Vijayan, L., Thiyyagesan, K., Sandaliyan, S., and Somasundaram, S. (2011) Status of major wetlands and wetland birds in Kanyakumari, Coimbatore, Thanjavur, Thiruvarur, Perambalur, Cuddalore, Nagapattinam and Trichy districts in Tamil Nadu, India. *World Journal of Zoology* 6 (3): 235–242.

Islam, M.Z. and Rahmani, A.R. (2008) *Potential and Existing Ramsar Sites in India*. Indian Bird Conservation Network: Bombay Natural History Society, BirdLife International and Royal Society for the Protection of Birds. Oxford University Press, New Delhi. Pp. 592.

Meganathan, T. (2002) A survey of avian diversity in selected Inland Lakes of Cuddalore, Thiruvarur, Nagai, and Thanjavur districts of Tamil Nadu, Southern India and an assessment of threats to their conservation including socio-economic factors in the surrounding villages. M.Sc Dissertation, A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Wetlands International (2012) *Waterbird Population Estimates: Fifth Edition*. Wetlands International Global Series No. 12. Wageningen, The Netherlands. (online version).

VETTANGUDI BIRD SANCTUARY

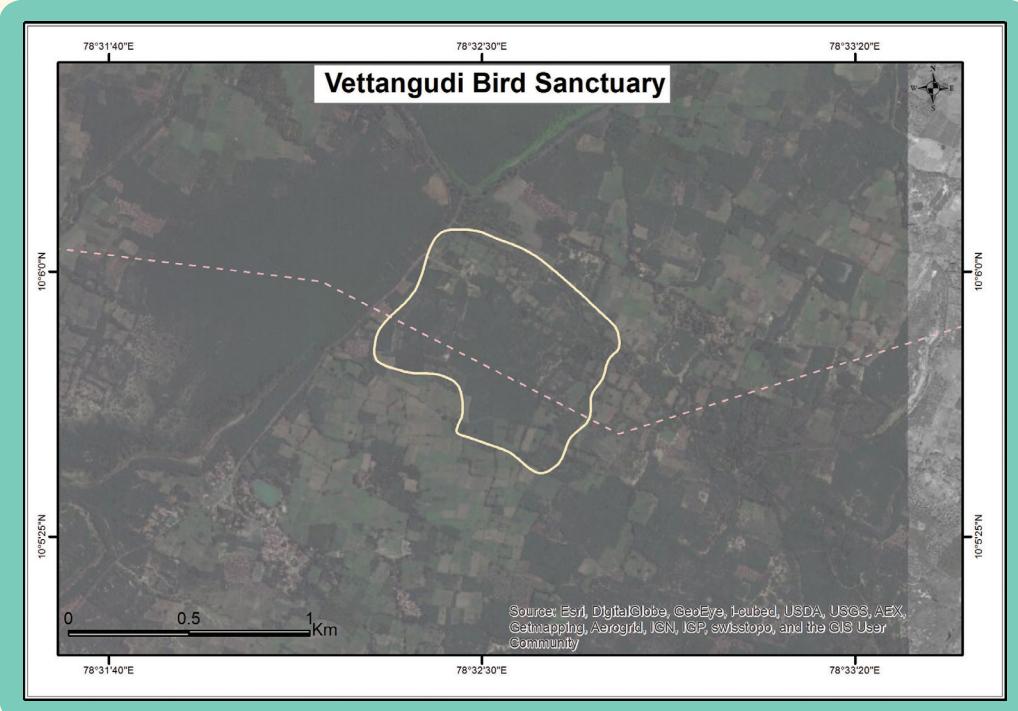
IN-TN-31

BA Site Code	: IN-TN-31
Administrative Region (State)	: Tamil Nadu
District	: Sivagangai
Coordinates	: 10° 05' 53" N, 78° 32' 23" E
Ownership	: State

Area	: 38 ha
Altitude	: 70 msl
Rainfall	: 943 mm
Temperature	: 20 °C to 35 °C
Biogeographic Zone	: Deccan Peninsula
Habitats	: Freshwater Reservoir

IBA CRITERIA: A4i ($\geq 1\%$ biogeographic population)

PROTECTION STATUS: Wildlife Sanctuary, established June, 1997



GENERAL DESCRIPTION

Vettangudi Bird Sanctuary is located in Sivagangai district, although its administration is under the authority of Ramanad district. The sanctuary is c. 2 km from Solasakarakottai village, c. 10 km from Tirupattur and c. 51 km from Madurai on the Madurai-Melun-Tirupattur road. The Vettangudi Bird Sanctuary (38.4 ha) consists of three freshwater tanks: Periyakollukudi-kanmai (13.5 ha), Chinnakollukudi-kanmai (6.2 ha), and Vettangudi-kanmai (18.2 ha). All three tanks are in the vicinity of villages and were together declared as a sanctuary in 1997.

The sanctuary receives its major rainfall from the northeast monsoon, with 330–390 mm precipitation between October and December. The southwest monsoon also brings some showers between June and September.

Thus, from June to December, rain water helps to sustain the breeding birds at Vettangudi. Besides this, Vaigai, the major river of the district, and surrounding paddyfields also provide foraging habitats.

The area surrounding the wetland has been invaded by *Prosopis chilensis*, which was introduced a few decades ago. *Acacia nilotica* trees grow in the lake and remain submerged for a few months. On the bunds, large *Tamarindus indica*, *Azadirachta indica*, and *Mangifera indica* trees are present which provide roosting sites for birds.

This IBA is also a potential Ramsar site as it qualifies for the following Ramsar criteria: Criteria 2 (wetland supports threatened ecological communities), Criteria 5 (wetland regularly supports 20,000 or more waterbirds), and Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies). Ramsar classifies

this as Wetland Type 6 (Water storage impoundment) (Islam & Rahmani 2008)

AVIFAUNA

This site was selected as an IBA due to its large breeding colony of up to 5,000 birds. More than 250 nests of Asian Openbill *Anastomus oscitans* have been seen. The 1% threshold of Black-headed Ibis *Threskiornis melanocephalus* is 250 (Wetlands International 2012). In Vettangudi, up to 250 birds are found. Similarly, the Glossy Ibis *Plegadis falcinellus* is also found above 1% (i.e. 250 birds) threshold of its total biogeographic population (Wetlands International 2012). Little Cormorant *Microcarbo niger* and Indian Cormorant *Phalacrocorax fuscicollis* too breed here.

Waterfowl such as the Spot-billed Duck *Anas poecilorhyncha*, Northern Shoveller *Spatula clypeata* and Common Teal *A. crecca* also congregate at Vettangudi. Oriental Darter *Anhinga melanogaster* and Eurasian Spoonbill *Platalea leucorodia* are also seen in small numbers. The Spot-billed Pelican *Pelecanus philippensis* appears in Vettangudi to feast on the abundant fish, depending upon water conditions (Manakadan & Kannan 2003). Two Near Threatened species, Oriental Darter and Black-headed Ibis, also nest in this IBA.

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Eurasian Curlew	<i>Numenius arquata</i>
Black-tailed Godwit	<i>Limosa limosa</i>

OTHER KEY FAUNA

All the three tanks harbour fish species such as *Ambassis urotaenia*, *Channa punctatus*, *Ophiocelphalus* sp., and *Mystus tenegra*. Some of these fish form the major prey component for pelicans, storks, and cormorants.

LAND USE

- Water management
- Irrigation
- Fishing
- Firewood collection

THREATS AND CONSERVATION ISSUES

- Draining of water for irrigation during bird breeding season
- Firewood collection
- Tree felling
- Cattle grazing

There is great need to strengthen the tank bunds to avoid a breach due to heavy flow of water during the monsoon. This will help to store more water, which would be beneficial to both birds and farmers. The Forest Department intends to plant more trees inside the tanks. This would help to provide more space for roosting and nesting of birds.

Owing to siltation, the depth of the tanks is decreasing. There is a need to deepen the tanks by dredging. Perhaps villagers can be involved in this activity as they are the direct beneficiaries of the water supply. The Forest Department should also allow the farmers to collect guano for agriculture after the breeding season is over. This will help in creating more local support for the sanctuary.

As the sanctuary is very close to human habitations, anthropogenic disturbances increase during festivals. The birds start breeding from October. By the time chicks emerge in November, Diwali, the major festival is on, and lasts for about a week. Loud music and firecrackers are heard, which sometimes scare away the birds. This disturbance could be minimized through environmental awareness and the cooperation of the villagers.

Sometimes the water is drained for irrigation while the birds are breeding, exposing young chicks to ground predators. In construction with the villagers, attempts should be made to retain some water around nesting trees.

Invasive plants pose a serious threat to this IBA. Chandrasekaran *et al.* (2014) studied the impact of *Prosopis juliflora* on the breeding of birds and found that the number of eggs and chicks that fell from this tree was higher than that from *Acacia nilotica*.

KEY CONTRIBUTOR

V. Kannan

KEY REFERENCES

Chandrasekaran, S., Saraswathy, K., Saravananan, S., Kamladhasan, N., and Nagendran, N.A. (2014) Impact of *Prosopis juliflora* on nesting success of breeding wetland birds at Vettangudi Bird Sanctuary, South India. *Current Science* 106(5): 676–678.

Islam, M.Z. and Rahmani, A.R. (2008) *Potential and Existing Ramsar Sites in India*. Indian Bird Conservation Network: Bombay Natural History Society, BirdLife International and Royal Society for the Protection of Birds. Oxford University Press. Pp. 592.

Manakadan, R. and V. Kannan (2003) A study of Spot-billed Pelican *Pelecanus philippensis* with special reference to its conservation. Final Report. Bombay Natural History Society, Mumbai.

Wetlands International (2012) *Waterbird Population Estimates: Fifth Edition*. Wetlands International Global Series No. 12. Wageningen, The Netherlands. (online version).

WATRAP PERIAKULAM AND VIRAKASAMUTHRAKULAM

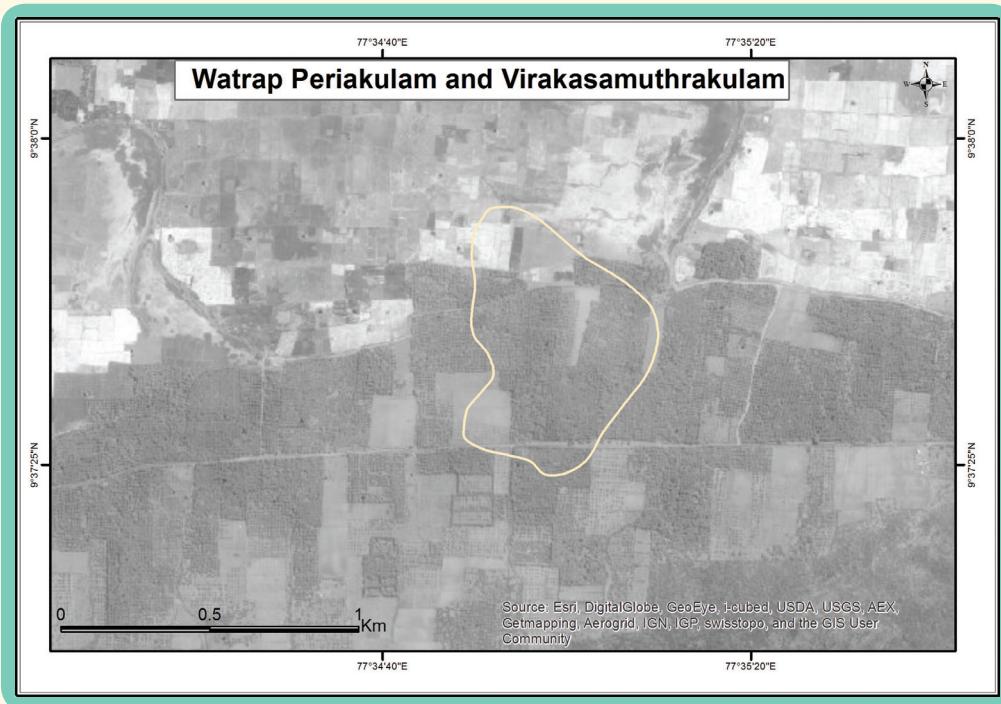
IN-TN-32

IBA Site Code	: IN-TN-32
Administrative Region (State)	: Tamil Nadu
District	: Virudhunagar
Coordinates	: 09° 31' 60" N, 77° 31' 00" E
Ownership	: State (Irrigation Dept.)

Area	: 251 ha
Altitude	: 2 msl
Rainfall	: 580 mm
Temperature	: 22 °C to 39 °C
Biogeographic Zone	: Deccan Peninsula
Habitat	: Freshwater Swamp

IBA CRITERIA: A1 (Threatened species), A4i ($\geq 1\%$ of biogeographic population), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS: Not officially protected.



GENERAL DESCRIPTION

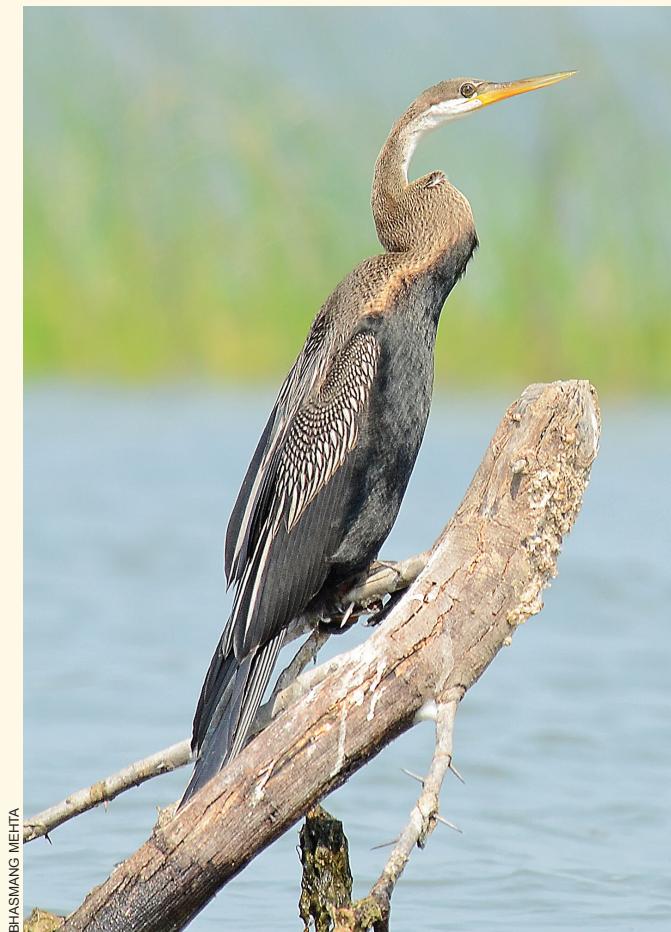
Watrap Periakulam and Virakasamuthrakulam are situated 5 km west of the town Watrap in Virudhunagar district. The two wetlands are divided by the Watrap-Pulavakkal dam road. These wetlands receive water from the Pulavakkal dam situated in the Srivilliputhur Hills of the Western Ghats. Locally they are called 'system tanks.' Periakulam has been planted with a large number of *Acacia nilotica* trees which attract breeding and roosting waterbirds. Areas covered by *Scirpus* are frequented by rails and grebes. The Virakasamuthrakulam tank is more open, and devoid of *Acacia nilotica*. According to the villagers, the open water attracts congregations of ducks and pelicans. The wetlands are not rich in aquatic flora, except for *Scirpus*, *Cyperus pygmaeus*, *C. difformis*, and *Cynodon dactylon*.

This IBA is also a potential Ramsar site as it qualifies for the following Ramsar criteria: Criteria 2 (wetland supports

threatened ecological communities), Criteria 5 (wetland regularly supports 20,000 or more waterbirds), and Criteria 6 (wetland regularly supports 1% of the individuals in a population of one species or subspecies). Ramsar classifies this as Wetland Type 6 (Water storage impoundment) (Islam & Rahmani 2008).

AVIFAUNA

This site has been selected as an IBA based on the large number of congregatory waterfowl, and especially as a nesting site for a small population of the Spot-billed Pelican *Pelecanus philippensis*. In February 2003, five pelicans and one nest were recorded by S. Balachandran of BNHS (Manakadan & Kannan 2003). Besides the Spot-billed Pelican, species such as Purple Heron *Ardea purpurea*, Little Cormorant *Microcarbo niger*, Cattle Egret *Bubulcus ibis*, Little Egret *Egretta garzetta*, and Great Egret *Casmerodius*



BHASMANG MEHTA

A total of 153 Oriental Darter *Anhinga melanogaster* have been reported from here, which is much more than the 1% threshold mentioned by Wetlands International (2012)

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Black-tailed Godwit	<i>Limosa limosa</i>

albus nest on the numerous *Acacia nilotica* trees growing inside Periakulam. Eurasian Coot *Fulica atra* is also found breeding in these wetlands. In January 2003, a very large roost of various birds was seen. There were more than 3,000 Little Cormorant, over 5,500 Grey-headed Starling *Sturnus malabaricus*, nearly 1,000 Common Myna *Acridotheres tristis*, and large numbers of Cattle and Little Egrets on the *Acacia nilotica* trees.

A total of 153 Oriental Darter *Anhinga melanogaster* have been reported from here, which is much more than the

1% threshold mentioned by Wetlands International (2012). The surrounding paddyfields attract a large number of birds such as Rosy Starling *Pastor roseus*, especially during the harvesting period. According to the local farmers, ducks frequent Virakasamuthrakulam in thousands when the tanks are full. It is likely that the two wetlands and their environs would easily support over 20,000 birds in a year of good monsoon.

OTHER KEY FAUNA

As this wetland is surrounded by human habitations, there is little mammal diversity. Black-naped Hare *Lepus nigricollis*, Jungle Cat *Felis chaus*, Small Indian Civet *Viverricula indica*, and Golden Jackal *Canis aureus* are seen, as in most other agricultural areas of peninsular India.

LAND USE

- Irrigation and Fishing

THREATS AND CONSERVATION ISSUES

- Poaching of ducks
- Collection of eggs and chicks
- Illegal tree felling

Bird eggs and chicks are illegally collected due to the absence of vigilance of Forest Department staff. There is a possibility of the establishment of a pelicanry in this site, if suitable measures are taken by the Forest Department (Manakadan & Kannan 2003). The invasive weed, Water Hyacinth *Eichhornia crassipes*, needs to be controlled.

KEY CONTRIBUTORS

S. Balachandran, S.S. Ramchandra Raja.

KEY REFERENCES

Islam, M.Z. and Rahmani, A.R. (2008) *Potential and Existing Ramsar Sites in India*. Indian Bird Conservation Network: Bombay Natural History Society, BirdLife International and Royal Society for the Protection of Birds. Oxford University Press. Pp. 592.

Manakadan, R. and Kannan, V. (2003) A Study of the Spot-billed Pelican *Pelecanus philippensis* Gmelin in Southern India with special reference to its conservation. Final Report. Bombay Natural History Society, Mumbai. Pp. 78.

Wetlands International (2012) *Waterbird Population Estimates: Fifth Edition*. Wetlands International Global Series No. 12. Wageningen, The Netherlands. (online version).

WELLINGTON RESERVOIR

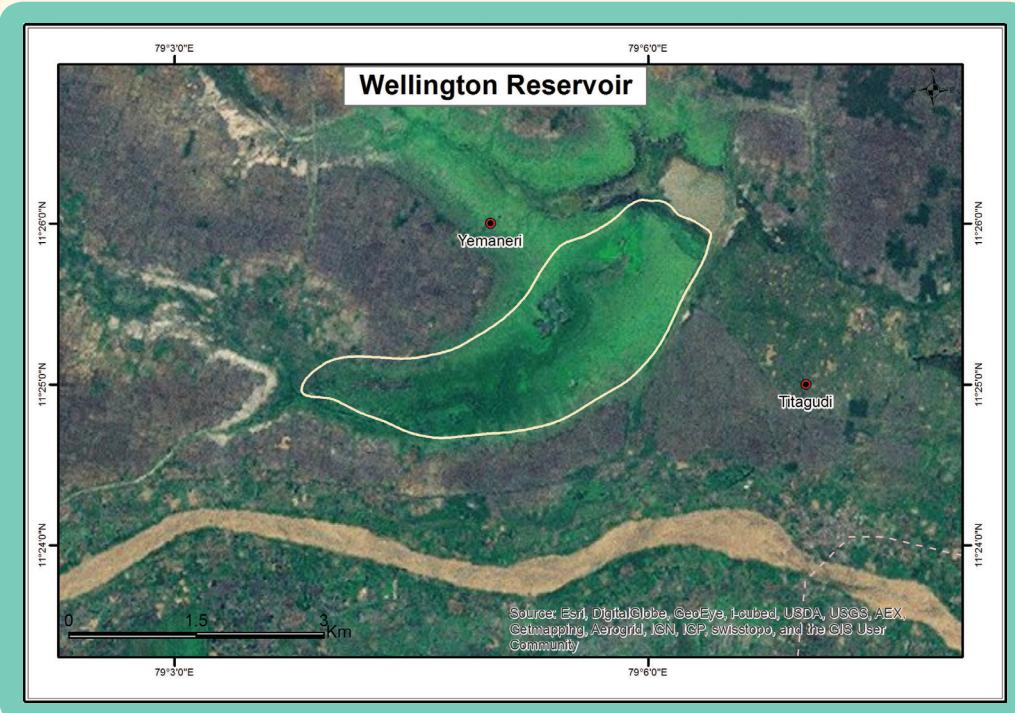
IN-TN-33

IBA Site Code	: IN-TN-33
Administrative Region (State)	: Tamil Nadu
District	: Cuddalore
Coordinates	: 11° 25' 00" N, 79° 00' 00" E
Ownership	: State

Area	: 650 ha
Altitude	: 72 msl
Rainfall	: 1,000 mm
Temperature	: 28 °C to 41 °C
Biogeographic Zone	: Deccan Peninsula
Habitats	: Aquatic, Freshwater Swamp

IBA CRITERIA: A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS: Not officially protected. IBA in danger.



GENERAL DESCRIPTION

The 650 ha Wellington Reservoir is located in Keelacheruvai village, c. 3.2 km from Tittagudy town in Cuddalore district. The reservoir is locally called Yemaneri. It receives water mainly from the Vellar river, which originates in Salem district and flows from west to east. The tank also receives water from Tholudur regulator through a supply channel, and drainage from a catchment area of 129 sq. km during the northeast monsoons. This reservoir supports 10,000 ha of agricultural fields for irrigation. The length of the bund is c. 4 km. The maximum depth of the lake is c. 9 m.

The waterbody has rich benthic flora and other hydrophytes. The Forest Department has planted *Acacia nilotica* all over the reservoir. Thick growth of *Acacia* is seen in the northern part of the reservoir. Besides the plantation,

there are dense stands of old *Acacia nilotica* and *Prosopis chilensis*.

The reservoir used to support huge numbers of waterbirds, but now their population has gone down, so we consider this as an IBA in Danger.

AVIFAUNA

Wellington Reservoir was selected as an IBA as there used to be a large congregation of waterfowl, sometimes more than 20,000 in all. The dominant avian species of the lake are ducks, Northern Pintail *Anas acuta*, Red-crested Pochard *Netta rufina*, Lesser Whistling-duck *Dendrocygna javanica*, and Northern Shoveller *Spatula clypeata*. The number of waterbirds has gone down. Guptha *et al.* (2011) found only 2,783 waterbirds belonging to 27 species during their research from January to March, 2006. However, with



BHASMANG MEHTA

Wellington Reservoir used to attract more than 20,000 waterbirds, including a large number of Black-tailed Godwit *Limosa limosa*

NEAR THREATENED

Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Black-tailed Godwit	<i>Limosa limosa</i>

better protection and maintenance of the waterspread, it is likely that waterbirds would congregate in large numbers (Meganathan 2002).

OTHER KEY FAUNA

There is not much wildlife in the area as the reservoir is surrounded by agricultural fields and human habitations, but the fish fauna is obviously quite rich. The Fisheries Department has introduced commercial fish such as *Catla catla*, *Labeo rohita*, and *Cirrhinus mrigala* that also serves as good food for piscivorous birds.

LAND USE

- Agriculture
- Domestic use
- Fishing
- Livestock grazing
- Water management

THREATS AND CONSERVATION ISSUES

- Heavy poaching pressure
- Pesticide pollution from catchment areas during monsoon
- Fuel wood collection

Like most of the old reservoirs of Tamil Nadu, Wellington suffers from neglect and is in a state of disrepair. The bunds must be reconstructed to stop leakages. This will help in storing more water during the monsoon for irrigation and other uses for the rest of the year. It will also provide water for a longer period for the waterfowl. It is important to appoint a Forest Department guard/official to safeguard the wild birds from being poached by local tribes, especially Narikurava, who are professional bird trappers.

The lake has nine villages on the periphery (with a total population of almost 19,250). The people mainly use the lake and environs for fishing and cattle grazing. The surrounding agricultural lands are subjected to a variety of pesticides.

Wellington Reservoir could play an important role in conservation education. Students from schools and colleges can be brought here to generate interest in birdwatching.

KEY CONTRIBUTOR

V. Kannan

KEY REFERENCES

Guptha, M.B., Sridharan, N., Vijayan, L., Thiayagesan, K., Sandaliyan, S., and Somasundaram, S. (2011) Status of major wetlands and wetland birds in Kanyakumari, Coimbatore, Thanjavur, Thiruvarur, Perambalur, Cuddalore, Nagapattinam and Trichy districts in Tamilnadu, India. *World Journal of Zoology* 6 (3): 235–242.

Meganathan, T. (2002) A survey of avian diversity in selected Inland Lakes of Cuddalore, Thiruvarur, Nagai, and Thanjavur districts of Tamil Nadu, Southern India and an assessment of threats to their conservation including socio-economic factors in the surrounding villages. M.Sc. Dissertation, A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

MUTHUKUZHI

IN-TN-34

IBA Site Code	: IN-TN-34
State	: Tamil Nadu
District	: Nagercoil
Coordinates	: 8° 30' 00" N, 77° 22' 60" E
Ownership	: Not available

Area	: Not available
Altitude	: Not available
Rainfall	: Not available
Temperature	: Not available
Biogeographic Zone	: Western Ghats
Habitats	: Montane Wet Temperate Forest

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats)

PROTECTION STATUS: Not officially protected.

MAP NOT AVAILABLE

GENERAL DESCRIPTION

Almost the entire area of Muthukuzhi lies within the Kalakad-Mundanthurai Tiger Reserve (KMTR) (part of Virapuli Reserved Forest annexed to KMTR). Some areas in and around the Upper Kodayar reservoir belong to the Tamil Nadu Electricity Board. This IBA is a transition zone from mid-elevation tropical wet evergreen forests to montane *shola* grasslands. There are extensive grasslands around the reservoir, and patches of evergreen forest on the slopes. The vegetation on the islands within the reservoir has been badly altered due to planting of non-indigenous species like *Eucalyptus* sp.

BIRDS AND OTHER BIODIVERSITY

Detailed information on avifauna is lacking, however, as this site is within the Kalakad-Mundanthurai Tiger Reserve, the birdlife is not very different from the Reserve. This is a Data Deficient site.

OTHER FAUNA

Gaur *Bos frontalis*, Tiger *Panthera tigris*, Leopard *P. pardus*, Asian Elephant *Elephas maximus*, Sambar *Cervus unicolor*, Barking Deer *Muntiacus muntjak*, Mouse Deer *Moschiola meminna*, Lion-tailed Macaque *Macaca silenus*, Nilgiri Langur *Trachypithecus johnii*, Brown-palm Civet *Paradoxurus jerdoni* and Nilgiri Marten *Martes gwatkinsi* and many other mammals are recorded from this IBA (Johnsingh 2001).

LAND USE

- Private plantation
- Electricity board enclaves

THREATS AND CONSERVATION ISSUES

- Disturbance
- Forest fires
- Grazing and Exotic tree plantations
- Invasive species

ENDANGERED	
Nilgiri Laughingthrush	<i>Garrulax cachinnans</i>
VULNERABLE	
Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>
White-bellied Shortwing	<i>Brachypteryx major</i>
Broad-tailed Grass-Warbler	<i>Schoenicola platyura</i>
NEAR THREATENED	
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudata</i>
ENDEMIC BIRD AREAS 123: WESTERN GHATS	
Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Grey-headed Bulbul	<i>Pycnonotus priocephalus</i>
White-bellied Shortwing	<i>Brachypteryx major</i>
Wynaad Laughingthrush	<i>Garrulax delesserti</i>
Nilgiri Laughingthrush	<i>Garrulax cachinnans</i>
Grey-breasted Laughingthrush	<i>Garrulax jerdoni</i>
Indian Rufous Babbler	<i>Turdoides subrufus</i>
Broad-tailed Grass-Warbler	<i>Schoenicola platyura</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudata</i>
White-bellied Blue-Flycatcher	<i>Cyornis pallipes</i>
Small Sunbird	<i>Nectarinia minima</i>
White-bellied Treepie	<i>Dendrocitta leucogastra</i>

Disturbance is caused due to reservoir and electricity board settlements, roads and operations. The other threats to this IBA are the fragmentation of habitat, exotic tree plantations programmes especially *Eucalyptus* sp., forest fires and grazing. The adjoining grasslands are grazed by cattle and feral buffalos.

KEY CONTRIBUTORS

Divya Mudappa, T. R. Shankar Raman and Nature Conservation Foundation, Mysore

KEY REFERENCE

Johnsingh, A. J. T. (2001) The Kalakad-Mundanthurai Tiger Reserve: A global heritage of biological diversity. *Current Science* 80: 378–388.

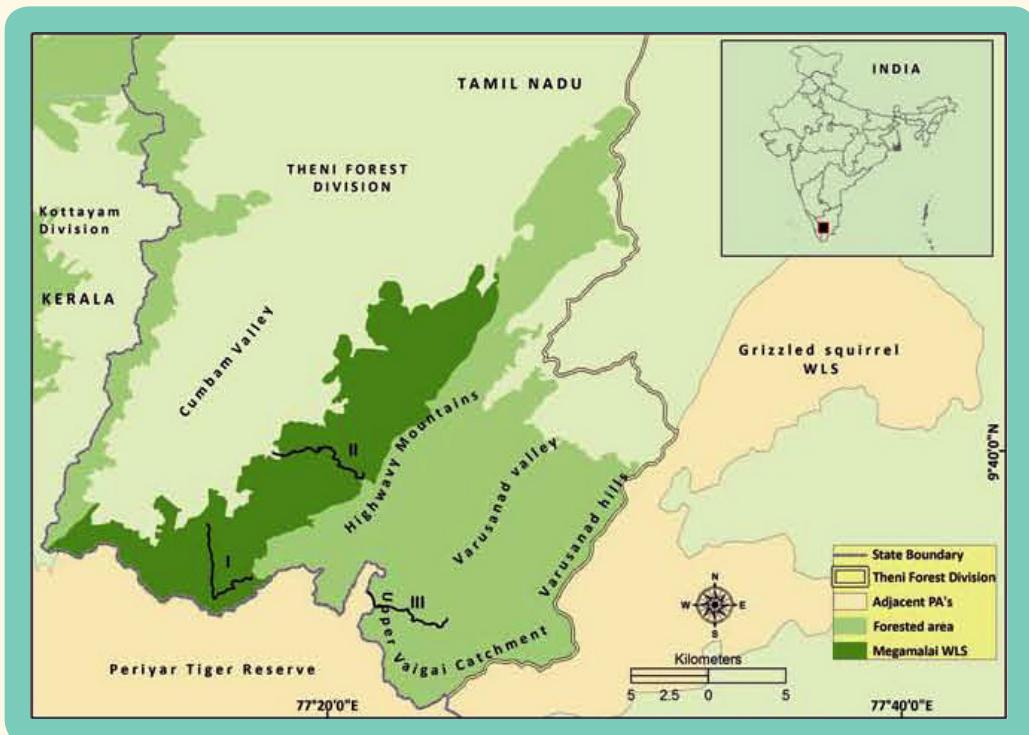
MEGAMALAI MOUNTAINS

IBA Site Code	: IN-TN-35
Administrative Region (State)	: Tamil Nadu
District	: Theni
Coordinates	: 9° 31' to 9° 51' N, 77° 10' to 77° 30' E
Ownership	: State
Area	: 49,000 ha

Altitude	: 200–2010 msl
Rainfall	: 3,000 mm
Temperature	: Not available
Biogeographic Zone	: Western Ghats
Habitats	: Montane Grassy Slopes, Tropical Secondary Scrub, Tropical Grassland

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats)

PROTECTION STATUS: 6,900 ha protected as Megamalai Wildlife Sanctuary.



GENERAL DESCRIPTIONS

The Megamalai mountain range, popularly known as High Wavy Mountains, has been included in the Periyar-Agasthyamalai Corridor by Critical Ecosystem Partnership Fund (CEPF 2007). It is bounded by Periyar Tiger Reserve on the southwest, Srivilliputhur Grizzled Squirrel Wildlife Sanctuary on the south and southeast, Cumbam floodplains/valley on the north and northeast, and alluvial plains of Theni-Periyakulam on the northeast. A portion of the forest (269 sq. km) has recently been declared as Megamalai Wildlife Sanctuary. Major vegetation types include Montane Shola Grassland, Tropical Wet Evergreen, Moist Deciduous, and Dry Deciduous Forests, Riparian and Dry Thorn Forests, economic crops (tea, coffee, cardamom) and plantations (timber). Most parts of the area receive rainfall from the

northeast monsoon, but the plateaux (hill tops) receive higher rain during the southwest monsoon.

The Megamalai range, one of the eastern offshoots of the southern Western Ghats located in the transition zone of leeward and windward regions, holds both dry and wet zone birds. A total of 254 bird species was observed in the area, including Threatened and Near Threatened species, and many Western Ghats endemics. Birds of the area represent predominantly two biome-restricted assemblages (Biome 10 and 11) but a few species represent other biome-restricted assemblages as well (Biome 7: four species; Biome 8: two species).

AVIFAUNA

Nichols (1944a,b; 1945) reported extensively on the bird

CRITICALLY ENDANGERED	
Long-billed Vulture	<i>Gyps indicus</i>
ENDANGERED	
Egyptian Vulture	<i>Neophron percnopterus</i>
White-bellied Blue Robin	<i>Myiomela albiventris</i>
VULNERABLE	
Asian Woollyneck	<i>Ciconia episcopus</i>
Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>
NEAR THREATENED	
Spot-billed Pelican	<i>Pelecanus philippensis</i>
Oriental Darter	<i>Anhinda melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Pallid Harrier	<i>Circus macrourus</i>
Grey-headed Fish-eagle	<i>Ichthyophaga ichthyaetus</i>
Red-headed Falcon	<i>Falco chicquera</i>
Malabar Pied Hornbill	<i>Anthracoceros coronatus</i>
Great Pied Hornbill	<i>Buceros bicornis</i>
Grey-headed Bulbul	<i>Microtarsus priocephalus</i>
Palni Laughingthrush	<i>Strophocincla jerdoni</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>
ENDEMIC BIRD AREA 123: WESTERN GHATS	
Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>
Blue-winged Parakeet	<i>Psittacula columbooides</i>
Malabar Grey Hornbill	<i>Ocyceros griseus</i>
Nilgiri Pipit	<i>Anthus nilghiriensis</i>
Grey-headed Bulbul	<i>Pycnonotus priocephalus</i>
White-bellied Blue Robin	<i>Myiomela albiventris</i>
Grey-breasted Laughingthrush	<i>Garrulax jerdoni</i>
Indian Rufous Babbler	<i>Turdoides subrufus</i>
Indian Broad-tailed Grass-warbler	<i>Schoenicola platyurus</i>
Black-and-Orange Flycatcher	<i>Ficedula nigrorufa</i>
Nilgiri Flycatcher	<i>Eumyias albicaudatus</i>
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>
Small Sunbird	<i>Leptocoma minima</i>
Malabar Barbet	<i>Psilopogon (Megalaima) malabarica</i>
Nilgiri Thrush	<i>Zoothera neilgherriensis</i>
Nilgiri Flowerpecker	<i>Dicaeum concolor</i>
Malabar Woodshrike	<i>Tephrodornis sylvicola</i>
Malabar Starling	<i>Sturnia blythii</i>

fauna of this mountain which was part of the erstwhile Madurai district. However, until now, no serious study on the birds of the area is available.

After a lapse of over six decades, Bhupathy *et al.* (2012) collated some information on the birds of Megamalai. Subsequently, S. Babu, while carrying out a CEPF-ATREE and Rufford small grant project for identifying critical links for large mammals, systematically recorded birds of the area between July, 2011 and July, 2012. In 254 bird species were reported/observed from Megamalai mountains, which included 10 migratory, 53 resident migratory and 191 resident species. Out of 55 families, family Muscicapidae

(47 species) has the highest species richness, followed by Accipitridae (19 species) and Columbidae (12 species). Based on primary habitat use, Bhupathy *et al.* (2012) identified 40 species of birds as wetland associated and 214 species as forest dependent.

The only sight record of Red-faced Malkoha *Phaenicophaeus pyrrhocephalus* in India is from this mountain (Biddulph 1956), but it is considered unconfirmed by Hoffmann (1996). Furthermore, a one-year survey by Bhupathy *et al.* (2012) in the range failed to obtain evidence of its occurrence there.

Threatened and Near Threatened birds such as White-bellied Blue Robin *Myiomela albiventris*, Nilgiri Wood-pigeon *Columba elphinstonii*, Palni Laughingthrush *Strophocincla jerdoni*, Great Pied Hornbill *Buceros bicornis*, Spot-billed Pelican *Pelecanus philippensis*, Painted Stork *Mycteria leucocephala*, and Black-headed Ibis *Threskiornis melanocephalus* were observed in the area. Eighteen endemic species and six globally Threatened birds have been observed in the mountains. These are Critically Endangered Long-billed Vulture *Gyps indicus*, others are Endangered, Egyptian Vulture *Neophron percnopterus*, White-bellied Blue Robin *Myiomela albiventris*, and Vulnerable Indian Broad-tailed Grass-warbler *Schoenicola platyurus*, Nilgiri Pipit *Anthus nilghiriensis* and Nilgiri Wood-pigeon, besides 13 Near Threatened species.

OTHER KEY FAUNA

Most of the mammals found in the sholas of the Nilgiris are also found here. Noteworthy species are Nilgiri Langur *Trachypithecus johni*, Tiger *Panthera tigris*, Leopard *P. pardus*, Wild Dog *Cuon alpinus*, Sambar *Rusa unicolor*, and Barking Deer *Muntiacus muntjak*. Not much research has been done on the reptile fauna of this IBA, but it could not be very different from other similar extant sholas.

LAND USE

- Forestry
- Plantation

THREATS AND CONSERVATION ISSUES

- Consequences of monoculture plantation and invasive species
- Overgrazing
- Conversion of forests to cultivation
- Extensive use of inorganic pesticides

Like any other forest of the Western Ghats, the Megamalai forest has been subjected to a succession of large-scale monoculture plantations of Wattle *Acacia mearnsii*, Eucalyptus or Blue Gum *Eucalyptus globosus*, and Pine *Pinus patula*. Now, invasive weeds such as Scotch Broom *Cytisus scoparius* and *Ulex europaea* have invaded this site, putting further pressure on the natural ecosystem.



A.J.T. JOHNSINGH

Megamalai range is popularly known as High Wavy Mountains due to its undulating topography. It is a critical wildlife corridor

Settlements around the site have grown mainly because of migration of people from the plains, encouraged by several development projects. This has resulted in habitat degradation through firewood collection, illegal tree felling and overgrazing.

Depletion of the shola undergrowth has affected the population of important bird species such as the White-bellied Blue Robin and Nilgiri Laughingthrush.

There is an urgent need to protect this area with the active involvement of the inhabitants of the surrounding settlements, if long term conservation of the biodiversity in general and bird community in particular is to be ensured.

KEY CONTRIBUTORS

S. Babu, S. Bhupathy.

KEY REFERENCES

Bhupathy, S., Srinivas, G., Sathishkumar, N., Murugesan, M., Babu, S., Suganthasakthivel, R., and Sivakumar, P. (2012) Diversity and conservation of selected biota of the Megamalai landscape, Western Ghats, India. *Current Science* 102(4): 590–595.

Biddulph, B.H. (1956) Occurrence of the Red-faced Malkoha (*Phaenicophaeus pyrrhocephalus*) Pennant in Madurai District: Madras presidency. *JBNHS* 53(1): 697–698.

CEPF (2007) Ecosystem profile: Western Ghats & Sri Lanka biodiversity hotspot, Western Ghats region. p. 95

Hoffmann, T.W. (1996) New bird records in Sri Lanka and some connected matters. *JBNHS* 96: 382–388.

Nichols, E.D. (1944a) Occurrence of birds in Madura District, Part I. *JBNHS* 44(3): 378–407.

Nichols, E.D. (1944b) Occurrence of birds in Madura District, Part II. *JBNHS* 44(4): 574–584.

Nichols, E.D. (1945) Occurrence of birds in Madura District, Part III. *JBNHS* 45(2): 122–132.

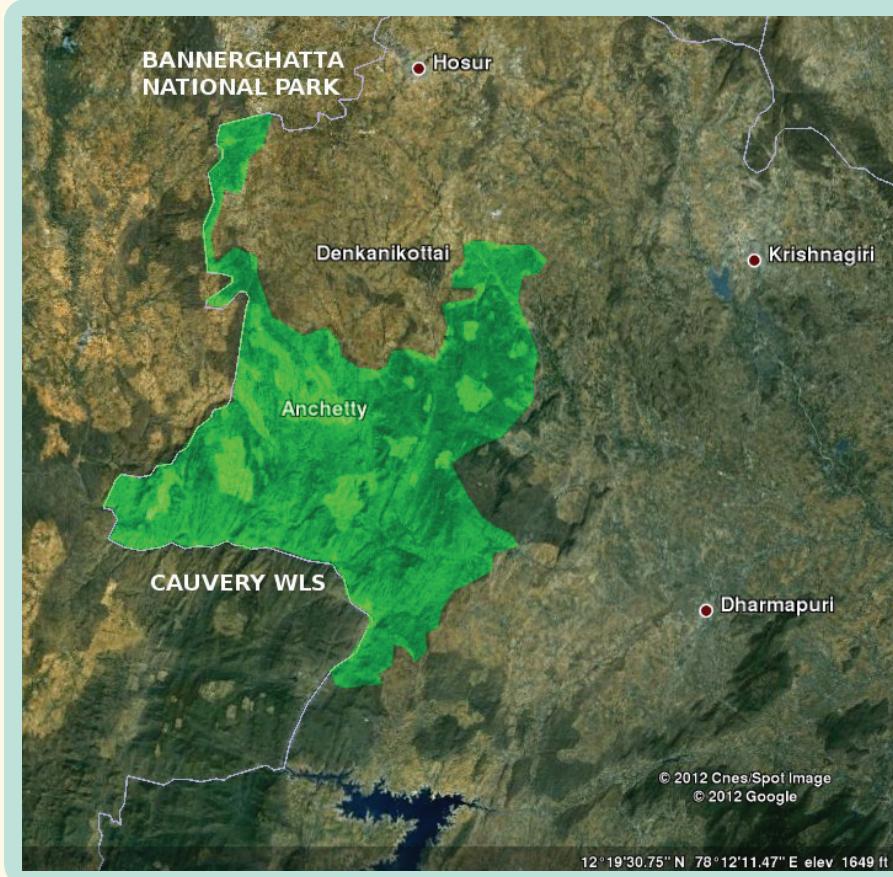
MELAGIRIS

IN-TN-36

IBA Site Code	: IN-TN-36	Altitude	: 300–1,395 msl
Administrative Region (State)	: Tamil Nadu	Rainfall	: 620–1,000 mm
District	: Krishnagiri, Dharmapuri	Temperature	: 10 °C to 35 °C
Coordinates	: 8.727824 °N, 77.496106 °E	Biogeographic Zone	: Deccan Peninsula
Ownership	: State	Habitats	: Tropical Dry Deciduous Forest, Tropical Dry Evergreen Forest, Riverine Vegetation,
Area	: 115310.30 ha		

IBA CRITERIA: A1 (Threatened species), A2 (Endemic Bird Area 123: Western Ghats),
A3 (Biome 10: Indian Peninsula Tropical Moist Forest, Biome11: Indo-Malayan Tropical Dry Zone)

PROTECTION STATUS: Not protected.



GENERAL DESCRIPTION

The Melagiris are a group of hills lying between the Cauvery and Chinnar rivers, to the southeast of Hosur taluk in Tamil Nadu. The Melagiris form part of an almost unbroken stretch of forests connecting Bannerghatta National Park, Karnataka (which forms the northwestern boundary) to the forests of Cauvery Wildlife Sanctuary, Karnataka its southern boundary, separated by the River Cauvery, and further to the Biligirirangan Hills and Sathyamangalam forests. The northern and western parts are comparatively plain and are part of the Mysore plateau. The average elevation in this region is 500–1,000 msl. The

altitude sinks to 300 msl in the Cauvery valley, and the highest point is Guthereyan peak at 1,395.11 msl.

Red sandy loam is the most common soil type found in this region. Small deposits of alluvium are found along the Cauvery and Chinnar rivers and kaolinite is found in some areas near Jowlagiri.

The temperature ranges from 10 °C–35 °C. The southwest monsoon is fairly active mostly in the northern areas, but the northeast monsoon is distinctly heavier in the region. The average rainfall is 760 mm, but some pockets in Denkanikottai Range receive up to 1,000 mm rainfall.

ENDANGERED

Egyptian Vulture	<i>Neophron percnopterus</i>
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VULNERABLE

White-naped Tit	<i>Parus nuchalis</i>
Indian Spotted Eagle	<i>Clanga hastata</i>
Asian Woollyneck	<i>Ciconia episcopus</i>
Nilgiri Wood-pigeon	<i>Columba elphinstonii</i>

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Spot-billed Pelican	<i>Pelecanus philippensis</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Lesser Fish-eagle	<i>Ichthyophaga humilis</i>
Pallid Harrier	<i>Circus macrourus</i>
River Tern	<i>Sterna aurantia</i>

ENDEMIC BIRD AREA 123: WESTERN GHATS

Malabar Parakeet	<i>Psittacula columboides</i>
Small Sunbird	<i>Leptocoma minima</i>
Nilgiri Woodpigeon	<i>Columba elphinstonii</i>
Nilgiri Flowerpecker	<i>Dicaeum concolor</i>

The total area proposed is about 115,310 ha in Hosur and Dharmapuri Forest Divisions, Tamil Nadu. The Cauvery North Wildlife Sanctuary forms the bulk of the IBA. Reserve forests contiguous with the sanctuary are also part of

the IBA. These are Ulibanda, Tagatti, Ubraini, Urigam, Kesthur, Billikal, Mallahalli, Natrampalayam, Biligundlu, and Wodappati Reserve Forests of Hosur Division and Wodpatti, Guthereyan, Kesarguli, and Morappur Reserve Forests of Dharmapuri Division.

Most parts of the forests are classified under Southern Tropical Dry Mixed Deciduous Forests (5A/C3). Southern Tropical Riverine Forests (5/B1) form a narrow strip along the Cauvery and Chinnar rivers. The Southern Tropical Dry Evergreen Forests (7/C1) are found in some sheltered pockets in Denkanikottai Range where rainfall is around 1,000 mm and elevation is 800–1315 msl. Southern Tropical Dry Deciduous Scrub Forests (5A/DS1) are seen mostly near the forest borders. *Hardwickia binata*, *Terminalia arjuna*, *Tamarindus indica*, *Garcinia gummigutta*, *Shorea roxburghii*, *Santalum album*, and Bamboo are some of the important flora found in the area (Mani 2007).

AVIFAUNA

The birds seen in the Melagiris are mostly typical of tropical dry deciduous/dry scrub forests. Variations from this pattern are seen along the Cauvery and Chinnar rivers, and in the evergreen patches of Denkanikottai Range. A total of 268 species have been recorded from the area (Govindara



Egyptian Vulture *Neophron percnopterus* has been seen nesting in Devarbetta in Jowlagiri Range

2009). A comprehensive bird survey was conducted in February, 2014 which helped to collect a lot of first hand data about the birds in Melagiris (Tom & Praveen 2014).

A pair of Egyptian Vultures *Neophron percnopterus* was seen nesting in Devarbetta in Jowlagiri Range and photographed. Indian Spotted Eagle *Clanga hastata*, a Vulnerable species, is widespread in Hosur Forest Division, and has been recorded from Denkanikottai, Hosur, Rayakottai, and Urigam areas. White-naped Tit *Parus nuchalis*, another Vulnerable species, has been recorded from Denkanikottai in Hosur Division and parts of Dharmapuri Division. The birds seen here are a part of the small surviving south Indian population in the southern portions of the Eastern Ghats. A flock of Nilgiri Woodpigeon *Columba elphinstonii* was recorded from Kodekarai during the Melagiri Bird Survey in 2014.

Grey-headed Fish-eagle *Ichthyophaga ichthyaetus* (Near Threatened) was also reported from the area until three years ago. These sightings could have been of Lesser Fish-eagle *Ichthyophaga humilis* and need to be verified (Praveen 2011). All fish-eagles recorded during Melagiri Bird Survey 2014 were also Lesser, which makes this even more probable. Also, White-rumped Vulture *Gyps bengalensis* (Critically Endangered), Long-billed Vulture *Gyps indicus* (Critically Endangered) and Yellow-throated Bulbul *Pycnonotus*

xantholaemus (Vulnerable) have been documented from both the nearby IBAs of Bannerghatta National Park and Cauvery Wildlife Sanctuary, Karnataka. Since the Melagiris constitute a contiguous patch of forest between these two IBAs, it is probable that these birds are present in Melagiris but have not been documented yet.

Melagiris has at least four restricted-range species from Endemic Bird Area 123 (Western Ghats). A good population of Blue-winged Parakeet, now termed Malabar Parakeet *Psittacula columboides* is present in the forests of Denkanikottai Range.

Out of the 15 species that represent Biome 10 (Indian Peninsula Tropical Moist Forest), seven have been documented from Melagiris.

Thirty-five out of the 59 species that represent Biome 11 (Indo-Malayan Tropical Dry Zone) have been documented in this region.

OTHER KEY FAUNA

The riverine forests along the Cauvery provide an ideal habitat for the Grizzled Giant Squirrel *Ratufa macroura dandolena*, a species threatened by rapid habitat loss. The region is estimated to have 150–200 Asiatic Elephant *Elephas maximus*, but this number varies throughout the year. Other mammals found in the area are the Sloth



Grizzled Giant Squirrel *Ratufa macroura dandolena*, is found in the riverine forest along the Cauvery river

Bear *Melursus ursinus*, Dhole *Cuon alpinus*, Leopard *Panthera pardus*, Four-horned Antelope *Tetracerus quadricornis*, Sambar *Rusa unicolor*, Cheetal *Axis axis*, Mouse Deer *Moschiola indica*, Barking Deer *Muntiacus muntjak*. Small Indian Civet *Viverricula indica*, Common Grey Mongoose *Herpestes edwardsii*, Madras Tree Shrew *Anathana elliotti*, Jungle Cat *Felis chaus*, Golden Jackal *Canis aureus*, Black-naped Hare *Lepus nigricollis*, Bonnet Macaque *Macaca radiata*, Wild Boar *Sus scrofa*, Gaur *Bos gaurus*, Common Palm Civet *Paradoxurus hermaphroditus*,

Mouse Deer *Moschiola indica*, Barking Deer *Muntiacus muntjak*, Ruddy Mongoose *Herpestes smithii*, Stripe-necked Mongoose *Herpestes vitticollis*, Slender Loris *Loris tardigradus* and Rusty-spotted Cat *Prionailurus rubiginosus*, (Asian Nature Conservation Foundation & Kenneth Anderson Nature Society 2010). Around 32 species of reptiles, including Marsh Crocodile *Crocodylus palustris*, Indian Rock Python *Python molurus*, Indian Cobra *Naja naja*, Russell's Viper *Daboia russelii* and Common Sand Boa *Gongylophis conicus* are found. Besides, 10 species of amphibians, 18 species of fishes, and over 250 species of flora have been documented.

THREATS AND CONSERVATION ISSUES

- No legal protection
- Human-Elephant conflict
- Grazing
- Poaching
- Agricultural expansion
- Invasive species
- Absence of scientific study and Census of Wildlife

Large parts of the forests of Melagiris are reserve forests, and do not enjoy the protection status of a wildlife sanctuary or national park even, though the stretch is a prime wildlife habitat and borders Cauvery North Wildlife Sanctuary in Tamil Nadu and Cauvery Wildlife Sanctuary in Karnataka. The forests are largely unexplored and no scientific study of its biodiversity or systematic wildlife census has been carried out. Anthropogenic pressures in the form of illegal firewood collection, poaching, cattle penning, goat-grazing, fairs and festivals inside reserve forests, and forest fires go unchecked, in spite of the best efforts of the Forest Department.



SOURYANT NANDY

Smooth-coated Otter *Lutrogale perspicillata* is commonly found in the Cauvery river

KEY CONTRIBUTORS

Kenneth Anderson Nature Society, George Tom, S.R. Sanjeev Kumar.

KEY REFERENCES

Asian Nature Conservation Foundation & Kenneth Anderson Nature Society (2010) Vertebrate Faunal Diversity in Hosur Forest Division and its Contiguous Habitats in Dharmapuri Forest Division of Tamil Nadu, India. A Draft Summary Report to the Tamil Nadu Forest Department. Bangalore.

Govindaraj, K. (2009) Avifauna of Hosur Forest Division, Eastern Ghats, Southern India. *Indian BIRDS* 4(4): 138–139.

Mani, P.A. (2007) Working Plan for the Hosur Forest Division. 1 April 2007 to 31 March 2017. Vellore Working Plan Circle. Vellore.

Praveen, J. (2011) An update on the distribution of Lesser Fish-Eagle *Ichthyophaga humilis* in southern India. *Indian BIRDS* 7(1): 14–16

Tom, George and Praveen J. (2014) Bird Diversity of Melagiris: A study of the Avifauna of Melagiri Hills, Hosur Forest Division, Tamil Nadu. Tamil Forest Department, Kenneth Anderson Nature Society and IBCN.

Links

Gnanaskandan K., Kailash Prasad (2009) Report on Wildlife Census in Jowlagiri Range. Retrieved from <http://groups.yahoo.com/group/bngbirds/message/16903>

Mike Prince, Vijay Ramachandran, Sachin Shurpali, Praveen, J. (2009) Melagiri Birding Trip-4. Retrieved from <http://groups.yahoo.com/group/bngbirds/message/16729>

Praveen J, Dipu Karuthedathu, Sachin Shurpali (2009) Pied Tits and Still More. Melagiri Birding. Retrieved from <http://groups.yahoo.com/group/bngbirds/message/16666>

S. Subramanya, Raju, A.K. Devarbetta Revisited, (2008) Retrieved from <http://groups.yahoo.com/group/bngbirds/message/16061>

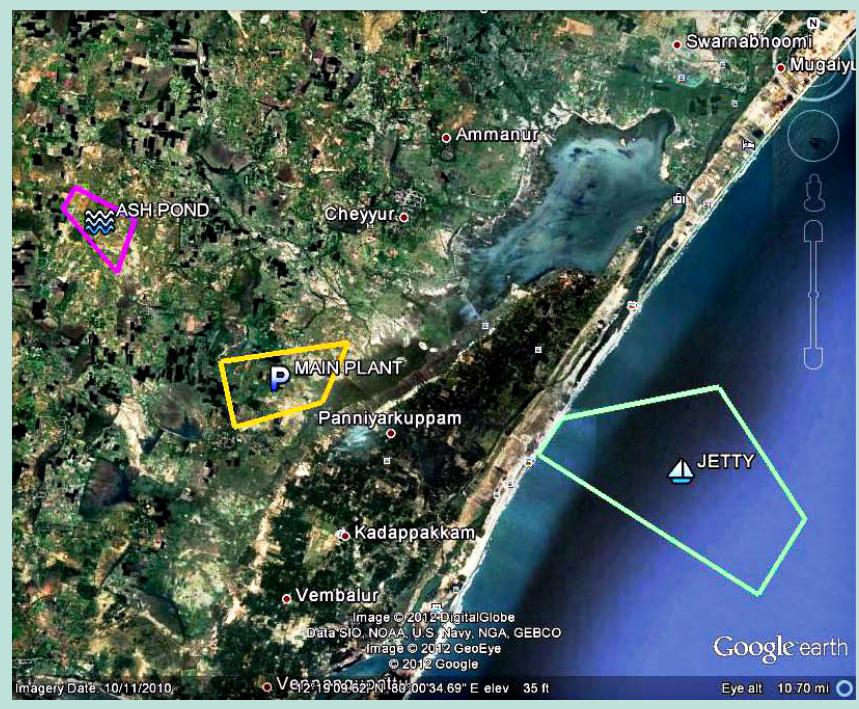
ODIYUR LAGOON

IN-TN-37

IBA Site Code	: IN-TN-37	Area	: 1,000 ha
Administrative Region (State)	: Tamil Nadu	Altitude	: 15 msl
District	: Kanchipuram	Rainfall	: 1,200 mm
Coordinates	: 12° 02' to 12° 19' N; 80° 03' to 80° 03' E	Temperature	: 19.8 °C to 36.6 °C
Ownership	: State	Biogeographic Zone	: Deccan Peninsula
		Habitats	: Brackish lagoon, Mangroves

IBA CRITERIA: A4i (>1% biogeographic population)

PROTECTION STATUS: Not officially protected.



GENERAL DESCRIPTION

The Odiyur Lagoon, also called Cheyyur Lagoon, is located in Cheyyur taluk of Kancheepuram district. The lake is c. 10 km long and 5 km wide; it is shallow with an average depth of 50 cm. The lake has a number of small freshwater canals flowing into it from irrigation tanks, agricultural lands, and the catchment area. It opens into the sea, and another mouth has been dredged for about 500 m to facilitate the drainage of flood waters during the monsoon. The salinity varies from 10 to 28 ppt, with lower salinity in the inland areas and higher near the mouth; there is a sharp fall in salinity during the monsoon. The seagrass *Halophila ovalis* is common and scattered throughout the lagoon. Remnants of mangroves occur at some sites near to the coast. Besides crab and prawn species, 24 species of fish have been recorded from the lagoon.

The wetland is known to support around 77 bird species. These include resident and seasonal migrants (which breed elsewhere in the region), and winter migrants. Well known for its Greater Flamingo *Phoenicopterus roseus* congregation, this site also hosts Lesser Flamingo *Phoeniconaias minor* during the winter. Large flocks of Northern Pintail *Anas acuta* (9,000), Common Pochard *Aythya ferina* (2,500), Eurasian Wigeon *Anas penelope* (3,960) were recorded here during the Asian Waterfowl Counts that took place during 2004–2012.

At least eight species recorded here are in the Threatened and Near Threatened list of IUCN and Birdlife International (2014). Although, Indian Skimmer *Rynchops albicollis*, a Vulnerable species, has been reported from here, as it was a stray record of few birds, the site does not qualify A1 (Threatened species). However, Odiyur Lagoon qualifies A4i (> 1% biogeographical population).

VULNERABLE

Indian Skimmer *Rynchops albicollis*

NEAR THREATENED

Oriental Darter	<i>Anhinga melanogaster</i>
Painted Stork	<i>Mycteria leucocephala</i>
Black-headed Ibis	<i>Threskiornis melanocephalus</i>
Black-tailed Godwit	<i>Limosa limosa</i>
Spot-billed Pelican	<i>Pelecanus philippensis</i>
Lesser Flamingo	<i>Phoeniconaias minor</i>
Eurasian Curlew	<i>Numenius arquata</i>

AVIFAUNA

The Odiyur wetland is known to support c. 77 bird species (Manakadan 2014). These include resident and seasonal migrants (which breed elsewhere in the region), and winter migrants (species that breed in the Palaearctic/Himalayan region and spend the winter in the Indian region). As many as 15,150 unidentified ducks, 1,088 terns and 5,323 waders were recorded here during the Asian Waterfowl Count-2012.

The numbers of Near Threatened birds reported by Manakadan (2014) in this lagoon were Oriental Darter *Anhinga melanogaster* (13), Painted Stork *Mycteria leucocephala* (150), Black-tailed Godwit *Limosa limosa* (87), Lesser Flamingo *Phoeniconaias minor* (160), and Eurasian Curlew *Numenius arquata* (120). According to Wetlands International (2012), 1% population threshold of Black-headed Ibis *Threskiornis melanocephalus*, a Near Threatened species, is 250 individuals. More than 2,000 were sighted in this place. Similarly, the Spot-billed Pelican *Pelecanus philippensis* was sighted in far greater number than its 1% population threshold which is 100 for South Asia (Wetlands International 2012). A total of 473 individuals were counted at this site.

Although the Indian Skimmer *Rynchops albicollis* is mainly found in north India, a few birds are now seen in

south India. A lone bird was recorded (Manakadan 2014) in Odiyur Lagoon. Due to its increasing scarcity, the species is considered Vulnerable by BirdLife International (2014).

LAND USE

- Fishing, crab and prawn collection
- Salt pans

THREATS AND CONSERVATION ISSUES

- Proposed Cheyyur Thermal Power Plant: A coal-fired Ultra Mega Power Project (UMPP), to be located in the vicinity of the lagoon.
- Proposed captive port for receiving imported coal, to be located on the coast near the lagoon.
- Construction of a fly ash dyke in the catchment of the lagoon.
- Building of roads, infrastructure, construction of buildings and housing complexes.
- Land use changes in the surrounding areas from crop fields, grazing lands, scrub forest, and wetlands, now used by birds, to a more urbanized landscape.

KEY CONTRIBUTORS

Ranjit Manakadan, Tara Gandhi, Gnanaskandan, K.

KEY REFERENCES

BirdLife International (2014) IUCN Red List for birds. Downloaded from <http://www.birdlife.org>

Manakadan, R. (2014) Evaluation of the waterbirds of Odiyur lagoon – a wetland near the proposed Cheyyur Thermal Power Plant. Bombay Natural History Society and Madras Naturalists Society. Pp.13.

Wetlands International (2014) *Waterbird Population Estimates. Fifth edition*. Wetlands International. Wageningen, The Netherlands. (Online version).

PICHAVARAM MANGROVES

IN-TN-38

IBA Site Code	: IN-TN-38
Administrative	: Tamil Nadu
Region (State)	
District	: Cuddalore
Coordinates	: 11° 24' to 11° 27 N, 79° 46' to 79° 48' E
Ownership	: Tamil Nadu Forest Department
Area	: 1,474 ha (Reserve Forest 1,358 ha, Dense mangrove forest 325 ha, Degraded mangrove forest 375 ha, Waterbodies 380 ha, Sandy area 26.7%)

Altitude	: 5 msl
Rainfall	: c. 1,464 mm
Temperature	: 28 °C to 34 °C
Biogeographic Zone	: Coasts
Habitats	: Mangrove dominated microhabitats including marshy areas, mudflats, swamps, open water, creeks, canals, coastal sand banks, adjacent agricultural land, abandoned fields.

IBA CRITERIA: A1 (Threatened species), A4i ($\geq 1\%$ biogeographic population), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS: Reserve Forest.



GENERAL DESCRIPTION

Pichavaram has one of the significant and largest mangrove forests in India. It is located near the temple town of Chidambaram, which is one of the unique biodiversity spots in south India. It is situated between Vellar in the north, Coleroon in the south, and Uppanar in the west. It connects with the sea by a shallow opening in the sandy littoral strand. It consists of a number of small and large islets surrounded by numerous creeks, canals, and channels. The backwater canal which joins the mangroves with the River Kollidam is large and very deep. The Pichavaram mangrove wetland consists of three reserve forests, namely

Killai, Pichavaram, and Pichavaram Extension area. They include 51 islets ranging from 10 sq. km to 2 sq. km separated by an intricate system of creeks and channels that connect the Vellar, Uppanar, and Coleroon estuaries. The depth of the waterways through the mangroves varies from 0.3 to 3.0 m.

The Pichavaram Mangroves are considered to be one of the healthiest mangroves in the world. They consist of a vast expanse of water with islands covered with mangrove trees, primarily *Avicennia* spp. and *Rhizophora* spp. The sandy area is dominated by *Salicornia brachiata* *Suaeda maritima* *Sesuvium portulacastrum*, *Arthrocnemum*



KUMARAN SATHASIVAM

Pichavaram is one of the largest mangrove forests on the east coast of India. It is also considered one of the healthiest mangroves in the world. So far, 177 species of birds have been recorded

indicum, and *Excoecaria agallocha* are some of the other plants. The mangrove vegetation of Pichavaram includes *Acanthus ilicifolius*, *Aegiceras corniculatum*, *Avicennia marina*, *A. officinalis*, *Bruguiera cylindrica*, *Ceriops decandra*, *Lumnitzera racemosa*, *Rhizophora apiculata*, and *Suaeda monoica*. The Pichavaram mangrove biotope, with its peculiar topography and environmental conditions, supports many rare varieties of economically important shell and finfishes.

AVIFAUNA

Pichavaram Mangroves attract large a number of both long and short distance migrants, besides harbouring resident bird species (Sampath & Krishnamurthy 1989; 1990, 1993; Nagarajan & Thiyyagesan 1996, 2006; Muralidharan *et al.* 2014). In the mangroves, so far, 177 species of birds have been recorded (Sampath & Krishnamurthy 1989). In all, 75 waterbird species were reported (Nagarajan & Thiyyagesan 2014). The season for birds is from September to April. Peak numbers are seen from November to January (Nagarajan & Thiyyagesan 1996).

The Near Threatened species observed over the years were Oriental Darter *Anhinga melanogaster*, Painted Stork *Mycteria leucocephala*, Black-headed Ibis *Threskiornis melanocephalus*, Black-tailed Godwit *Limosa limosa*, Asian Dowitcher *Limnodromus semipalmatus*, River Tern *Sterna aurantia*, and Great Thick-knee *Esacus recurvirostris* (Nagarajan, *pers. comm.* 2014, Nagarajan & Thiyyagesan, forthcoming). Population counts made in the southern side of the mangroves indicated that the total number of waterbirds rose from 5,156 in 1987 to 13,097 birds in 1992. The number of species present (i.e., species richness) followed

the same pattern. A total of 50 species was recorded in 1987, which increased to a maximum of 63 in 1990. Furthermore, thousands of Black-crowned Night-heron *Nycticorax nycticorax* were found roosting in the dense areas of the mangroves and leaving at dusk.

During 2004–2007, 49 waterbird species were recorded, which was a severe reduction compared with Sampath's (1989) study, which had 82 during 1984–1988. Of the 33 species not recorded during our survey but recorded by Sampath (1989), almost half (16 species) were waders. The number of

species of Charadriiformes declined by 33%, Ciconiiformes by 30%, Anseriformes by 88%, the Pelecaniformes by 50% and Podicipediformes by 100% (Sandilyan *et al.* 2010). The variations in waterbird population indicated that the Pichavaram mangroves were rich in waterbirds before the early 1990s. Although several threats were identified for waterbirds, the most significant was the deprivation of freshwater flow to Pichavaram areas which completely changed the land use pattern and productivity of the mangroves and the adjoining areas. The abandonment of agriculture due to lack of water in the Pichavaram region after the mid-1990s reduced the foraging grounds of waterbirds (Nagarajan & Thiyyagesan forthcoming). For example, salinity of this area ranged from 5 to 47%. In addition, significant salinity fluctuations in adjoining habitats of Pichavaram Mangroves were also reported. Selvam (2003) reported that freshwater recharge was considerably reduced; prior to the 1980s, Pichavaram Mangroves received 73 TMC (thousand million cubic feet) of freshwater from the River Coleroon. By the late eighties, it had decreased to 31 TMC and, currently, with further depletion, it has reached 3.5 TMC.

The availability of different habitat types such as channels, creeks, gullies, mudflats and sand flats and adjacent seashore offers ideal habitat for different species of birds and animals (Nagarajan and Thiyyagesan 1996). Nagarajan and Thiyyagesan (1998) found that adjoining croplands played an important role in attracting the birds to the Pichavaram mangroves. The waterbirds showed preference for different microhabitats for various activities. For example, they used the agricultural lands for foraging and mangroves for roosting (Nagarajan & Thiyyagesan 1998). In addition, terrestrial birds roosted in the mangrove vegetations of the margin areas,

particularly the Common Myna *Acridotheres tristis* roost with herons and egrets, and in *Excoecaria agallocha*. In addition, many terrestrial birds, particularly the Rose-ringed Parakeet *Psittacula krameri* and Brahminy Kite *Haliastur indus* nest intensively inside the forests. The total population of all bird species in different parts of the mangroves could exceed over 100,000 individuals.

The Wildlife Biology Division of Anbanathapuram Vagayara Charity College (Autonomous) (A.V.C), Mayiladuthurai have conducted studies on avifaunal dynamics, and CAS in Marine Biology, Annamalai University, Parangipettai has conducted studies on various marine biological aspects. These studies highlight the importance of this mangrove area for the welfare of both the local people and birds.

OTHER KEY FAUNA

The mammals of this area include the Otter *Lutra lutra*, Golden Jackal *Canis aureus*, Small Asian Mongoose *Herpestes javanicus*, and Indian Gerbil *Tatera indica* (Nagarajan, *pers. comm.* 2014).

There are 95 species of zooplankton, 40 species of meiobenthos, 52 species of macrobenthos, and 177 species of fish in the Pichavaram Mangroves. The microzooplankton include tintinnids, rotifers, nauplius stages of copepods and veliger larvae of molluscs, with a predominance of tintinnids. *Tintinopsis* spp. alone account for 90% of abundance. The macrozooplankton consist of 95% copepods and coelenterates. The meiofauna is rich with nematodes (50–70% of the component), followed by foraminifera. The macrofauna include polychaetes, bivalves, gastropods, tanaids, isopods, amphipods, cirripedes, crabs, and shrimps. The mangrove harbours a large number of juvenile fishes, especially during summer and post-monsoon (Kathireshan 2000).

LAND USE

- Fishing
- Agriculture
- Grazing land
- Water management
- Fuel wood collection
- Medicinal plant collection

THREATS AND CONSERVATION ISSUES

- Timber collection
- Overfishing, particularly collection of brooders of prawn, crab

- Cattle grazing and trampling by cattle or humans
- Bird hunting
- Pollution
- Degradation of mangrove
- Natural disasters
- Holes, galls and leaf miner attack on plants
- Lack of freshwater flow and associated increase in salinity
- Drying of mangrove soil and increase salinity, raising welts on mangrove plants

KEY CONTRIBUTORS

R. Nagarajan, K. Thiyyagesan, S. Jayakumar,

KEY REFERENCES

Kathireshan, K. (2000) A review of studies on Pichavaram mangrove, southeast India. *Hydrobiologia* 430: 185–205.

Muralidharan, S., Sivasubramanian, C., Jayakumar, S., and Dhananjayan, V. (2014) Impact of agricultural pesticides on population status and breeding success of select species of fish-eating birds in Tamil Nadu. Final Report submitted to MOEF, Govt. of India.

Nagarajan, R. and Thiyyagesan, K. (1996) Waterbird population and substrate quality of the Pichavaram wetlands, southern India. *IBIS* 138: 710–721.

Nagarajan, R. and Thiyyagesan, K. (1998) Significance of adjacent croplands in attracting waterbirds to the Pichavaram Mangrove forests. Birds in Agriculture Ecosystems. Society for Applied Ornithology (India), Hyderabad, Pp: 172–181.

Nagarajan, R. and Thiyyagesan, K. (2006) The effects of coastal shrimp farming on birds in Indian mangrove forests and tidal flats. *Acta Zoologica Sinica* 52 (Supplement): 541–548.

Nagarajan, R. and Thiyyagesan, K. (2014) Population Dynamics of Waterbirds in Pichavaram Mangroves, Tamil Nadu, southern India across the Decades. *ENVIS: Wildlife and Protective Areas*, 16: 101–110.

Selvam, V. (2003) Environmental classification of mangrove wetlands of India. *Curr Sci* 84: 757–765.

Sampath, K. and Krishnamurthy, K. (1989) Birds of Pichavaram mangroves and the adjoining coastal environs. *J. Ecol. Sci.* 6: 24–38.

Sampath, K. and Krishnamoorthy, K. (1990) Shorebirds (Charadriiformes) of the Pichavaram mangroves. Tamil Nadu, India. *Wader Study Group Bulletin* 58: 24–27.

Sampath, K. and Krishnamurthy, K. (1993) Birds of the Pichavaram mangroves and the adjoining coastal environs. *Journal of Ecological Society* 6: 23–38.

Sandilyan, S., Thiyyagesan, K., and Nagarajan, R. (2010) Major decline in species richness of waterbirds in the Pichavaram mangrove wetlands, Southern India. *Wader Study Group Bulletin* 117: 91–98.

TIRUPPADAIMARUDUR CONSERVATION RESERVE

IBA Site Code	: IN-TN-39	Altitude	: 72 msl
Administrative	: Tamil Nadu	Rainfall	: 96 mm (June-Sep) southwest monsoon; 429 mm (Oct-Dec) northeast monsoon
Region (State)		Temperature	: 29–41 °C (March to June); 18–30 °C July to February
District	: Tirunelveli	Biogeographic Zone	: Deccan Plains
Coordinates	: 8.727824° N, 77.496106° E	Habitats	: Riparian.
Ownership	: Tamil Nadu Forest Department, Gram Panchayat (village council)		
Area	: 2.84 ha.		

IBA CRITERIA: A4i (Congregations: 1% of biogeographic population of congregatory waterbird)

PROTECTION STATUS: Conservation Reserve. The Forest Department and the local village panchayat have been involved in the declaration of the reserve and monitoring of activities related to hunting, poaching or other disturbances.

MAP NOT AVAILABLE

GENERAL DESCRIPTION

This is the first Conservation Reserve in Tamil Nadu and was created in 2005 (Kanagavel *et al.* 2013). It is located in Tiruppadaimarudur, a small village on the banks of the river Tamiraparani and close to the confluence of the Rivers Kadana and Tamiraparani. The village is known for its century-old Mahalinga Swamy Siva Temple. The temple complex and the village have several old trees of *Terminalia arjuna*, *Madhuca longifolia*, *Tamarindus indica*, and *Azadirachta indica* that are used as nesting sites by the Painted Stork *Mycteria leucocephala* and other bird species. Each year, during March-April, an average of 300 pairs of birds are known to nest in Tiruppadaimarudur. Recently, the Spot-billed Pelican *Pelecanus philippensis* was also recorded nesting here. A residential compound in the village hosts a rehabilitation facility where fallen nestlings are hand-reared and released later by a dedicated person. A retired Supreme Court Judge, a resident of the village, is said to have played a pivotal role in declaring the area as a Conservation Reserve.

The village is surrounded by paddyfields and is irrigated by a canal from the Tamiraparni river. On the banks of the river, the village community has planted several *Terminalia arjuna* trees which have grown into a small forest.

AVIFAUNA

Besides the famous colony of Painted Storks, several other species of birds nest in the trees. These include Spot-billed Pelican *Pelecanus philippensis*, Little Cormorant *Microcarbo niger*, Cattle Egret *Bubulcus ibis*, Little Egret *Egretta garzetta*, and Indian Pond-heron *Ardeola grayii* (Abhisheka *et al.* 2013). Other species known to be common in the area include Asian Openbill *Anastomus oscitans*, Black-headed Ibis *Threskiornis melanocephalus*, and Indian Cormorant

Phalacrocorax fuscicollis. There is also a nesting site of the Grey Heron *Ardea cinerea* in the reserve.

OTHER KEY FAUNA

About 3,000 Flying Fox *Pteropus giganteus* roost in the trees in the temple yard. The villagers have encountered Toddy Palm Civet *Paradoxurus hermaphroditus* which apparently reside inside the temple.

LAND USE

The location is predominantly surrounded by farmland. The river is a perennial source of water to the region.

THREAT AND CONSERVATION ISSUES

Sand mining from the river bed is an issue, but the local community has stopped that near the village. Many of the trees are ageing and some of the nesting trees are likely to fall. Some of the storks and other birds have already shifted to other shorter trees like *Prosopis juliflora* inside the village.

KEY CONTRIBUTORS

T. Ganesh, M.B. Prashanth, M. Mathivanan.

KEY REFERENCES

Abhisheka, K., David, J.P., Prashanth, M.B., Seshadri, K.S., and Ganesh, T. (2013) First detailed survey of waterbirds in Tirunelveli and Tuticorin districts, Tamil Nadu, India. *Journal of Threatened Taxa* 5(12): 4641–4652. <http://dx.doi.org/10.11609/JoTT.o3125.4641-52>.

Kanagavel, A., Pandya, R., Sinclair, C., Prithvi, A., and Raghavan, R. (2013) Community and conservation reserves in southern India: status, challenges and opportunities. *Journal of Threatened Taxa* 5(17): 5256–5265.